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# 2016 Oklahoma Research Day Full Program

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## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **01. Business Administration**

#### **01. Accounting**

##### **01.01.02 A Study of Financial Position and Expenditure of Confucius Institutes in U.S.**

**You,Lingling** *University of Central Oklahoma*

We choose to analyze Confucius institute financial data and look into their financial status to provide an objective viewpoint and a better understanding to Confucius Institutes in United States about whether they are a propaganda tool of Chinese government or independent academies. In our research process, we found the Chinese government invests millions of dollars to the Confucius Institutes. Most of expenditure of the Confucius Institutes comes from the funding of Chinese government. From this extent, we conclude that some of the Confucius Institutes' policies have to be regulated by the Chinese government. That is, they have to be approved by China. For example, some scholar meetings in Confucius Institute excluded scholars from Taiwan to speak in the public. However, the Confucius Institute also has some degree of academic independence and freedom. For instance, teachers in the Confucius Institutes can choose their preferred textbooks and use different teaching methods to teach students. As of now, we know that the Confucius institutes were supported by the Chinese government. On the other hand, there is some information shows academic independence and freedom in the Confucius institute as well.

### **01.01.03 Market Impact of Proved Reserves Disclosures By U.S. Publicly Held Oil and Gas Exploration and Development companies**

**Swanson,Zane** *University of Central Oklahoma*

U.S. Generally Accepted Accounting Principles (GAAP) permit publicly held oil and gas exploration and development companies (OGEs) to report exploration and development costs under either the successful efforts (SE) or the full cost pool (FC) method, which results in a lack of comparability of financial statements of FC and SE companies. In an attempt to eliminate information asymmetry, OGEs must disclose detailed information about proved reserves, including the discounted present value of future cash flows from proved reserves. This study investigates whether these reserve disclosures enhanced comparability between firms using FC and SE accounting. Quantitative research methods utilizing multiple regression analysis techniques examine whether the present value of future cash flows from proved reserves discounted at 10% (PV-10) and reserve quantity disclosures predict changes in market capitalization. Although the various reserve disclosures required by the FASB (FASB, 2014b) reduce information asymmetry between management and investors, the findings of this research indicate that investors in FC and SE companies use different data to determine stock prices. Therefore, these disclosures have not provided investors with a uniform set of criteria that can be used to compare a FC company with an SE company.

## **Abstracts from the 2016 Oklahoma Research Day**

**Held at Northeastern State University**

### **01. Business Administration**

### **02. Business**

#### **01.02.02 Start Spreading the News: New York has gone to Pot**

**Iudlum,marty** *University of Central Oklahoma*

**Ford,Darrell** *University of Central Oklahoma*

This paper will explore transformative changes in marijuana laws occurring in the last three years, culminating in New York State's innovative medical marijuana program. The paper will be in four sections. The first section will examine the historical policies on marijuana. The second section will examine the staggering changes from the last three years. The third section will examine the details of New York State's new medical marijuana law. The final section will conclude with a discussion of the potential impacts from New York's law, an ideal guide for state interested in a credible and effective medical marijuana program.

#### **01.02.03 Coming to an Indian Casino near you: Marijuana for Sale**

**Barger Johnson,Jennifer** *University of Central Oklahoma*

**Iudlum,marty** *University of Central Oklahoma*

In December, 2014, the Justice Department issued a memorandum to tell U.S. Attorneys to not prevent Indian tribes from growing or selling marijuana on tribal lands. While several states have recently allowed the sale of recreational marijuana (including Washington, Oregon, Alaska, and Colorado) this memo represents a change in the federal policy towards marijuana laws and potentially creates a new industry on tribal lands, the sale of marijuana.

#### **01.02.04 Forecasting the Dow Jones Industrial Average: An Approach of Exponential Smoothing with Trend Adjustment**

**Zhang,Hongkai** *East Central University*

**Deng,Sisi** *East Central University*

This empirical study is intended to forecast the daily Dow Jones Industrial Average, a major U.S. stock market index, over the time horizon of January 2, 2014 to October 16, 2015. Since the daily price index exhibits an upward trend over the period of January 2, 2014 to July 1, 2015 (denoted as Period 1), and a downward trend over the period of July 2, 2015 to October 16, 2015 (denoted as Period 2), an approach of exponential smoothing with trend adjustment is employed in this study to forecast the price index over each of the two periods of the time horizon. Thirty-one evenly spaced values (i.e.,  $-15 + i$ ;  $i = 0, 1, \dots, 30$ ) of the initial trend adjustment factor are each considered in our forecasting model for both Periods 1 and 2. The mean absolute deviation (MAD) and the mean squared error (MSE) are chosen to measure the forecasting errors. The computational results show that the forecasting model with the initial trend adjustment factor equal to zero is robust, which yields the lowest MAD and MSE over Period 1, whereas the model with the initial trend adjustment factor equal to 15 is robust over Period 2.

#### **01.02.05 Transaction Cost Economics vs. Behavioral Considerations: An Outsourcing Perspective**

**Muralitharan,Danita** *University of Central Oklahoma*

**Genchev,Stefan** *University of Central Oklahoma*

**Wert-Gray,Stacia** *University of Central Oklahoma*

Outsourcing has become a necessity for most companies in today's competitive environment. The importance of that decision is evidenced by a growing interest by academics worldwide as well. However, there are multiple factors involved in the decision to outsource or keep everything "in house." The present study focuses on transaction cost economics and behavioral considerations as two of the most important factors related to the decision. Transaction cost economics are defined here as cost pressures while behavioral considerations are related to emotions. These two perspectives define the purpose of the current research as to: First, investigate the relationship between transaction cost economics and the outsourcing decision making process. Second, analyse the behavioural factors involved and their relative importance compared to pure cost considerations. Qualitative research methodology was used to develop a frame of reference to help evaluate the transportation outsourcing decisions in relation to transaction costs and behavioral considerations. In-depth interviews served as the main qualitative method used to investigate the proposed relationships. The interviews were conducted at the Oklahoma State Fair with individuals with various responsibilities such as trainers and haulers within the equine industry. The initial findings reinforce the idea that together with a detailed cognitive assessment of the transporter capabilities, emotions also play a role.

## **01.02.06 U.S. International Trade in Goods and Services: A Time-Series Study**

**Lin,Jiajun** *East Central University*

**Zhang,Hongkai** *East Central University*

This study empirically examines the robustness of two statistical forecasting approaches, the weighted moving average (WMV) and the simple exponential smoothing (SES), with the seasonally adjusted monthly data of U.S. exports and imports of goods and services from January 2005 to December 2015. The computer software, POM for Window, is employed to perform computations over the time period mentioned above for both approaches. Twenty alternative WMV models (denoted by Group 1) and six alternative SES models (denoted by Group 2) are examined to compare their forecasting errors, respectively. We choose the mean squared error (MSE), an indicator commonly used to measure the overall forecasting error, to identify the best model for each type. Our computational results show that the two-month WMV model is the best in Group 1, while the SES model with the smoothing constant equal to unity is the optimal in Group 2.

## **01.02.07 EMR vs EHR- Is there really a Difference?**

**olive,marcus** *Northeastern State University*

Most people use the terms "electronic medical record" and "electronic health record" (or "EMR and EHR") interchangeably. But there is a difference. This poster will address the history, and the similarities and differences of both terms.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **01. Business Administration**

#### **03. Economics**

##### **01.03.01 Till the Finish Line Do Us Part**

**Mecoy, William** *University of Central Oklahoma*

Teamwork is a pivotal factor for any firm looking to improve output and efficiency (Manzoor 2011). Understanding how teamwork between genders works is vital for firms making business decisions. The goal of our study is to find if one gender is more concerned with personal goals over teamwork. Several studies argued that males and females may approach teamwork differently. Specifically, that males are usually more concerned about competition, while females are not as concerned about personal performance (Ivanova-Stenzel and Kübler 2009, Healy and Pate 2011) We use marathon data to identify the couples that started the race by running together yet did not finish together. We assume that the member of the couple who leaves the other behind is less committed to teamwork. The results of our study can be used by firm's managers to make informed decisions about teamwork composition. We identify couples as runners having the same last name, being from the same city, and being within 15 years of age with each other. Our study estimates percentage of males and percentage of females that advanced at the end of the race, while leaving their partner behind. We further use statistical analysis to determine whether the differences in these proportions are statistically significant. Also, we use simple regression analysis to estimate which of the genders is more likely to advance and leave the other partner behind based on the age, residence, race length, their average pace, etc.

### **01.03.03 Foreign Mergers & Acquisition in the U.S. Oil & Gas Market**

**Hsu,Kuang-Chung Hsu** *University of Central Oklahoma*

**Zhu,Zhen** *University of Central Oklahoma*

**Zhang,Xixi** *University of Central Oklahoma*

**Petty,Brittney** *University of Central Oklahoma*

Previous research such as Hsu et al. (2014) indicates that the number of multinational oil & gas companies that entered the U.S. market through mergers and acquisitions (M&A) was growing rapidly in the last decade. In the literature, however, the discussion of foreign direct investment (FDI) in the form of cross-border M&A in oil& gas industry is very limited. This project tends to investigate the facts and determinants of this certain type of FDI in US oil and gas market. Our research questions are: 1. what are the major motives and determinants of multinationals who invested in the form of M&A in U.S. oil& gas industries? 2. is FDI in the form of cross-border M&A in oil & gas industry different from the FDI in other industries? This project will be an empirical study. Data of M&A in U.S. oil& gas industry will be collected and analyzed. Our focus is the transactions involving foreign parties. The results of the project are expected to contribute the foreign investment and oil & gas literature.

### **01.03.04 Theory Meets Practice: Enhancing Business Statistics Learning with data from Cafeteria**

**Jog,Chintamani** *University of Central Oklahoma*

**Tilford,Dana** *University of Central Oklahoma*

**Alger,Opal** *University of Central Oklahoma*

**Webb,Ariel** *University of Central Oklahoma*

**Bhargava,Kanika** *University of Central Oklahoma*

Undergraduate statistics courses pose a challenge for instructors and students alike because it is often difficult to generate interest in the subject matter. This project envisions learning in an introductory business statistics course complemented by working with data from a student-run cafeteria at the University of Central Oklahoma. The two main goals of the project are: 1) Impact student perceptions towards statistics/data analysis 2) Develop long term partnership and collaborations across departments.



### **01.03.05 The Impact of New Emerging Trading Blocs on OPEC in the Global Oil Industry**

**Hansen,Kennedy** *University of Central Oklahoma*

**Pybas,Shelby** *University of Central Oklahoma*

**Zhu,Dr. Zhen** *University of Central Oklahoma*

**Mhlanga,Keith** *University of Central Oklahoma*

The main goal of our research is to explore how the emergence of new trading patterns will have an impact on OPEC's activities in the global oil industry. In North America, trading in the energy industry has increased between the USA, Canada, and Mexico. Likewise, in the East, energy trade activity has increased in the energy industry between Russia, China, and India. Our hypothesis is that the strengthening of these energy trading blocs will threaten OPEC's traditional influence in the global oil market in the distant future. In our study, we will examine the geopolitical and economic factors that lead to the formation of these various energy trading blocs around the world. Furthermore, we will discuss OPEC's possible reaction in the global market in response to the emergence of these blocs. Our data is mainly based on information from the International Energy Agency and U.S. Energy Information Administration.

### **01.03.06 Seasonality, Seasonal Spread and Intertemporal Arbitrage: The Case of U.S. Natural Gas Price**

**Zhu,Zhen** *University of Central Oklahoma*

Many commodity forward and futures prices exhibit seasonable patterns, not just in the term structure, but also in the evolution of the prices. Existing theories on commodity prices assumes deterministic seasonality in the forward curve. Our proposal intends to provide stylized facts on commodity price seasonality and explain the seasonality based on economic theory, with an application to an energy commodity – natural gas. Furthermore, we intend to explain the sources of the stochastic seasonality. This, in a sense, provides the explanations as to why seasonality is not deterministic but rather stochastic. We consider market fundamental variables that would be expected to drive the seasonality. We also intend to document the changing seasonal spreads as another dimension of the seasonal characteristics of the natural gas prices. We also will use various economic variables to find evidence on sources of the changing spread. Our main focus is on the understanding of the causes of seasonal variations based on economic theory of storable commodities. A better understanding of the seasonality in commodity prices contributes to the successful modeling of both the spot and futures prices, as well as the prices of commodity options. It also has significant impact on trading strategies and risk management practices for market participants in the commodity markets.

### **01.03.07 The Decline of Pemex: An Economic Perspective**

**Ngo, Brandon** *University of Central Oklahoma*

**Traxler, Tylor** *University of Central Oklahoma*

The objective of the research is to analyze and comprehend the diminishing production levels of the Mexican national oil firm Pemex, the results of its recent overhaul, and the impact on the oil industry as a whole. The primary focus of the research is the contribution of Pemex's monopolistic role in its decline in production over the last decade. We will also explore the possibility of a lag in oil exploration technologies resulting from the production monopoly that Pemex held for 76 years. Alongside this possible influence, more factors that may have compelled the recent decade's witness of declining production numbers, lack of investment, and the need for redistribution of reserve access will be examined. Along the primary research focus of Pemex's past production figures, we will briefly consider the company's future. It is highly likely that Pemex will retain its significantly large market share in Mexico for future years. However, the large number of reserve shares that have opened up for bidding may serve as a strong foundation for the development of the private oil market. Due to the high interest in developing these newly opened reserves, there is a strong possibility that joint ventures throughout Mexico and technological partnerships would ensue. Such an occurrence would benefit Pemex as well as private firms from countries such as the United States, Britain, and Russia, and would subsequently improve the overall oil market through competition.

### **01.03.08 A Path to Student Retention in Higher Education**

**Rassouli-Currier, Susanne** *University of Central Oklahoma*

**Embry, Kati** *University of Central Oklahoma*

**Clinton, M. Suzanne** *University of Central Oklahoma*

The low retention rate of students has been one of the most talked about issues in post-secondary educational institutions. Among existing studies, the majorities have investigated the factors affecting the retention rate by major and course rather than student retention at the aggregate college/university level. The present study aims to attain more information on student retention. The goal is that results will help administrators and faculty to better understand factors related to student retention and how to further engage students in activities and projects beyond the classroom in an attempt to affect retention rates. This study includes an extensive review of current literature on student retention (and receiving IRB approval). This review of research has helped us determine what factors significantly impact student retention rates and thus had an important role in the design of the questionnaire being used for our specific interests. These factors include: personal factors, demographic factors, ACT scores, academic performance, and financial stability impact among others. Further research and analysis determine the approximate level of significance for each of these factors and how they impact student retention. The findings are used to rank the factors accordingly.

### **01.03.09 Examining the Economic Costs of the Principal Agent Problem in Healthcare**

**Ghosh,Sanchari** *Northeastern State University*

**Aula,Mercy** *Northeastern State University*

Asymmetric information problems between healthcare providers and patients have contributed to escalating costs of healthcare across the country. The persistence of this imperfect information often leads to patients bearing large expenses, illustrating what is known in economics parlance, as the principal agent problem, where the principal (the patient) is exploited by the agent (healthcare provider) who has more knowledge about the nature of illness of the patient. This research focuses on the above principal agent problem in perpetuating healthcare costs, by examining data from the Health Expenditure Survey and the Current Population Survey on out of pocket expenses for US residents, who had some form of insurance coverage during 2009-2015. In addition, it attempts to determine empirically the impact of the Affordable Care Act in reducing out of pocket expenses, after controlling for socioeconomic and demographic characteristics and the type of insurance coverage held. The idea is to assess whether a system of mandatory coverage has the potential to decrease the prices charged for services through higher competition. Though debates on full implementation of the Act is still underway, this research can generate policy implications on the role of the current system in encouraging better flow of information between service providers and patients, so as to mitigate some of the high costs of healthcare affecting the economy.

### **01.03.10 Do Publicly Traded Companies Who Support Environmental Causes Outperform Those Who Don't?**

**Pepper,Cody** *University of Central Oklahoma*

Corporate executives are beholden to shareholders and expected to make decisions which maximize profits. In a strong economy for-profit companies make significant contributions to not-for-profit organizations in their community, often basing their giving on shared mission. When the economy slows these companies pull back their philanthropic gifts in order to focus all resources in areas that will increase profits in the short term, serving as an example that they view philanthropy as a financial burden rather than a sound financial investment. This research will look at the question, "Do publically traded companies who significantly support environmental causes outperform other companies in the stock market?" What if the act of philanthropic giving actually does increase shareholder value? Would these companies be obligated to continue giving in an economic downturn? This paper will examine potential correlation between companies who give, specifically to environmental causes, and increased stock prices when compared to the performance trends of other companies. To investigate these questions researchers will randomly select 100 companies from the S&P 500. They will be categorized as companies who significantly contribute to environmental causes or not and stock prices between 2000 and 2015 will be compared. This paper will look to see if companies who support environmental causes outperformed the companies who do not significantly support environmental caus

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **01. Business Administration**

#### **04. Finance**

##### **01.04.01 To Roth or Not: A Review and Analysis of Retirement Plan and Conversion Options**

**Krishnan,Sivarama** *University of Central Oklahoma*

**Cumbe,Julie** *University of Central Oklahoma*

The Roth IRA plan created in 1998 had limited access to individuals with incomes above certain limits. Tax law changes that were enacted in 2005 and later have made the benefits of a Roth retirement plan available to nearly everyone regardless of income levels through possible conversion of deductible IRAs. This paper develops a broader and multi-dimensional decision framework that includes a metric to be compared to expected marginal tax rate at withdrawal of funds as well as the minimum investment horizon needed to break-even in terms of expected after-tax future values of the alternatives. We also incorporate random variability in the expected returns. Roth conversion would benefit investors with long investment horizon who do not expect significant reduction in their marginal tax rates. The biggest uncertainty may be with respect to external tax law changes.

##### **01.04.02 A Time-Series Study of the Exchange Rates of US Dollar to Japanese Yen and Chinese Yuan**

**Zhang,Chenyue** *East Central University*

**Zhang,Hongkai** *East Central University*

Our study is conducted to forecast the monthly exchange rates of US dollar to Japanese Yen and Chinese Yuan over the time horizon of January 2005 to September 2015, respectively. The method of simple linear regression is employed in this study to forecast the exchange rates. Since the exchange rate of US dollar to Japanese Yen exhibits a downward trend over the period of January 2005 to December 2011 (denoted as Period 1) and an upward trend over the period of January 2012 to September 2015 (denoted as Period 2), the linear regression is separately performed over Periods 1 and 2. The coefficient of determination (R-squared) yielded by the linear regression is 0.76 and 0.94, respectively, indicating that the regression line satisfactorily fits the actual monthly exchanges rate over each of the two periods. In contrast, the exchange rate of US dollar to Chinese Yuan exhibits a downward trend over the time horizon of January 2005 and September 2015, and thus we perform the linear regression over this entire period. The resultant coefficient of determination (R-squared) is found to be 0.89, showing that the regression line fits the actual monthly exchange rate well over the 129-month time period.

### **01.04.03 Optimizing Your 401(k) After College**

**Johnson,Stephanie** *Southeastern Oklahoma State University*

Many young adults are not worried about their future until retirement age is upon them. One effective way of accumulating retirement savings is through tax deferred 401(k) plans. The 401(k) plan is a company sponsored plan that allows an employee to make contributions to their retirement savings plan before taxes. Even better, many employers match employees' contribution, partially or entirely. This allows the retirement funds to grow much faster. An employee has to decide how much he/she would like to contribute as well as the contribution distributed among a number of mutual funds. The purpose of this research is to discuss ways to optimize your 401k plan. This includes choosing the right mutual funds to distribute your contributions to and investigating the risks involved. I will also be proposing on the amount of money needed to be contributed in order to obtain the desired amount of retirement funds under different scenarios. This also includes allocating your assets in both aggressive and conservative funds.

### **01.04.04 Determinants of house prices in Enid, Oklahoma**

**Qayyum,Arif** *Cameron University*

**Aryal,Aastha** *Cameron University*

The purpose of this paper is to analyze the sales price of houses in Enid, Oklahoma and examine that how this sales price depends on different characteristics of the houses. Based on previous literature we choose the attributes, such as number of bedrooms, bathrooms, garage, fireplace, pool, house size, lot size, and the age of the house. The research also intends to highlight what attribute has the strongest bearing on the sold price of the house.

### **01.04.05 Analysis of house prices in Tulsa, Oklahoma**

**Qayyum,Arif** *Cameron University*

**Bisht,Rahul** *Cameron University*

The purpose of this paper is to analyze the prices of houses in Tulsa, Oklahoma and observe the relation between house price and house characteristics. In order to carry out our analysis, we considered factors such as number of bed rooms, number of bathrooms, parking spaces, lot size, fire place, pool, and the age of the house. This paper also analyzes the highly influential characteristics in setting house prices.

#### **01.04.06 Analysis of house prices in Stillwater, Oklahoma**

**Qayyum,Arif** *Cameron University*

**Rehman,Omer** *Cameron University*

**Bhusal,Raju** *Cameron University*

The purpose of this paper is to analyze the prices of houses in Stillwater, Oklahoma and examine the relation between house prices and housing characteristics. We analyze different factors such as number of bed rooms, number of bathrooms, parking spaces, lot size, fire place, pool, and the age of the house.

#### **01.04.07 Handling the Financial Crisis: Evidence from Home Improvement Stores**

**Qayyum,Arif** *Cameron University*

**Glenn,Weston** *Cameron University*

**Secrest,Nicole** *Cameron University*

**Velarde,Tera** *Cameron University*

In this paper, we analyze the home improvement stores during the financial crisis of 2008-2009 and after that. We analyze three largest and three smallest companies in the industry and see how they have performed during the period from 2007 to 2013. Home improvement stores are considered to be cyclical so we expect them to move with the market index but our results indicate that it is not the case.

#### **01.04.08 Automobile Industry: Large vs Small**

**Qayyum,Arif** *Cameron University*

**Joshi,Ayush** *Cameron University*

**Dykes,Michael** *Cameron University*

We analyze the automobile industry in United States of America from the period after the financial crisis. We examine three largest and three smallest companies in the industry and see how they have performed during the period from 2010 to 2014. We examine their performance individually and also in a portfolio during this period of five years.

#### **01.04.09 The Effect of Stock Market Movements on Human Behavior using Google Trends**

**Gerlitz,Immanuel-Carl** *Southeastern Oklahoma State University*

Objective The study examines the correlation between stock price movements and search engine search volume indicators. Search volume gives insight into behavioral aspects of finance, and how people make decisions. Hypothesis We expect the stock price to give indication for people's search behavior. A relationship between stock market movements and search behavior is measurable. The behavior can be fear-driven in a down market, and excitement-driven when stocks rise. Methodology We use data analysis to compare the percentage from Google Trends and historical returns data. Stocks & Indexes included in this study are Dow Jones Industrial Average (DJIA), Amazon, Inc. (AMZN), and Facebook (FB), and the search term "stock market." The time period for this study is between January 2015 and December 2015 using monthly data. Conclusion We observe that Google Trends' data lacks major events in the stock market by about a week. The stock market has an effect on the overall behavior of the people in the marketplace whether it is fear or excitement.

#### **01.04.10 Cameron University Stock Portfolio**

**Qayyum,Arif** *Cameron University*

**Sharkey,Krishtian** *Cameron University*

**Joshi,Ayush** *Cameron University*

**Dykes,Michael** *Cameron University*

**Short,Jacob** *Cameron University*

The purpose of this research is to analyze the risk and return of student managed Cameron University Stock Portfolio. We evaluate three years of investment data for Cameron's Portfolio and compare it to S&P 500 stock index. Our results present the importance of diversification and its influence on risk and return of a portfolio.

#### **01.04.11 Student Managed Bond Portfolio Vs Bond indices**

**Qayyum,Arif** *Cameron University*

**Glenn,Weston** *Cameron University*

**Secrest,Nicole** *Cameron University*

**Oligher,William** *Cameron University*

**Chaudhary,Jayant** *Cameron University*

The purpose of this research is to compare the risk and return of student managed Cameron University BancFirst bond Portfolio with national bonds indices. We examine three years of investment data from Cameron's Portfolio and compare it to data over the same period of national bond indices. Our results indicate the importance of diversification and its influence on risk and return of a portfolio.

#### **01.04.12 Stock buybacks revolution**

**Nziazi Lutumba,Tom Jones** *Southeastern Oklahoma State University*

**Bourobou,Wendrill** *Southeastern Oklahoma State University*

**Abstract** In the recent years, many US companies have been stepping up over stock buybacks, also known as stock repurchases. Stock buyback is the re-acquisition by a firm of its own stock from the market place. It is well documented that stock repurchases have direct impacts on the company's stock price. Indeed, during periods of falling interest rates and favorable market, companies can choose to invest in own shares to use available cash, and raise the price of their securities. Stock buyback also influences company's performance measures such as earning per share (EPS), which are sought by many investors. Stock repurchases allows the company to control its flow of capital, and to make it less vulnerable to potential takeover attempts. In addition, they increase the price of the company's shares and subsequently reward shareholders. The purpose of this research is to examine why some companies are stepping up over stock buybacks in recent years. We also investigate companies that used that strategy such as Apple and Microsoft on a case by case basis.



#### **01.04.13 Optimal Debt Resource Allocation for Paying off Student Debt and School Selection for Maximizing Earning Potential**

**Galewaler, Jeffrey** *Southeastern Oklahoma State University*

Abstract Students begin their college careers with a plethora of options for financing their continuing education. Pell Grants, Scholarships, FAFSA, subsidized or unsubsidized loan options, are all part of the equation in determining which debt type is the most cost effective to further one's education. The discussion begins with school type, public or private, and the various ranges in tuition that are charged per credit hour and the eventual payoff of earnings after graduation. The purpose of this research is to provide students with information that will be helpful in minimizing future debts and maximizing savings throughout their journey in higher education. Our hypothesis is that attendance of a state University or combination of a two-year school and a four-year school will help provide the largest cost savings and future income as opposed to similar private universities. We will discuss several variables including school size, tuition costs, graduation rates and the ultimate goal of every student maximum salary in the current job market. The fields our research will focus on are the fields of Science, Technology, Math, Engineering and Business. Our research seeks to prove the most cost effective measures to allocate future income to pay-off student loans while maximizing student's dollar to credit hour ratio, as well as, minimizing total costs associated with attending differing universities and the maximization of future earnings.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **01. Business Administration**

#### **05. Information and Operations Management**

##### **01.05.01 Determining the Effects of Tutoring Modality on MIS Student Performance, Course Evaluation, and Attrition Rate**

**Sein,Win** *University of Central Oklahoma*

**Cheng,Dr. Joselina** *University of Central Oklahoma*

**Miller,Dr. Lisa** *University of Central Oklahoma*

This proposal intended to analyze the effectiveness of cloud-based tutoring in relation to student performance in relation to gender, ethnicities, and preferred learning style. The study collected primary data by administering surveys to students who self-enrolled in online Management Information Systems (MIS) courses. Students were administered to the pre-survey at the beginning of the semester. The survey consisted closed-ended questions, Students could select from Likert-type scales (Strongly agree...strongly disagree). Data were analyzed and insights were gained from the study on how to enhance cloud-based tutoring. Students has different way of learning the materials and different opinions on how they perceive the effectiveness of online and F2F tutoring. We use mixed, primary, and secondary data collected from students to find areas where improvement is needed, and how to make online tutoring more effective. We've collected pre survey which included their demographics, learning styles, gender, ethnicities, etc. in this survey. Secondary data such as MIS course attrition (withdrawal/drop rates), student course evaluation, and aggregated course grade point averages will also be used to measure the effects of tutoring modality. As a result, we have better understanding of online tutoring and how we can improve to achieve optimal student performance.

##### **01.05.02 Comparison of Adobe Photoshop and GNU Image Manipulation Program (GIMP)**

**Rosener,William** *Northeastern State University*

Trying to decide which image creation and manipulation software is better for you? This poster presentation will compare and contrast two popular software application that allow users to create, retouch, edit, and modify images – Adobe Photoshop and GNU Image Manipulation Program (GIMP). More specifically, this project will compare 1) available options and features, 2) the ability to create original artwork, 3) file formats that can be opened, 4) formats for saving work, and 5) comparison of pricing. Hopefully, this project will help you decide overall whether Adobe Photoshop or GNU Image Manipulation Program is the better software for your image creation and manipulation needs.

### **01.05.03 E-Textbook Adoption**

**Luu,Jesse** *University of Central Oklahoma*

**Alexander,Christine** *University of Central Oklahoma*

University students utilize technology as part of their learning experience more than ever, but have yet to fully benefit from e-textbook technology. With the price of textbooks rising faster than any rate over the last 30 years, e-textbook sales have not risen to the level that has been expected. Previous research has looked into e-textbooks being light weight and easy to access. The research that has been conducted looks into why students have not adopted e-textbooks at a higher rate. With more and more students owning electronic devices capable of displaying e-textbooks, it is a wonder why it has not caught on at a higher rate. This research differs in that it looks into whether or not students are offered the choice of e-textbooks in classrooms, if students perceive the lower cost of e-textbooks as a value to them, and if students know how to fully utilize the functionalities that publishers provide as enhancements to e-textbooks.

### **01.05.04 Forget about the old cabs and take an Uber? An investigation into consumers' quality perception when engaging in consumer-to-consumer transactions.**

**Walker,Kenneth** *University of Central Oklahoma*

Social media and the Internet have allowed consumers to participate in the marketplace as both buyers and sellers. This project investigates the factors that affect consumers' perception of quality of services provided by other consumers. Specifically, I focus on how safety/security and professionalism affect the perceived value of services in C2C markets and how these effects vary between social and traditional consumers. The findings provide practical implications for the development of C2C platforms and businesses.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **01. Business Administration**

#### **06. Management**

##### **01.06.01 Dialectic Presence in the Digital Divide among African American Females**

**Sims, Jeanetta** *University of Central Oklahoma*

**Sims, Atoya** *University of Central Oklahoma*

Dialectical tensions capture perceptions of push and pull in relationships (e.g., happy/sad, good/bad). Using a relational dialectics approach, this project explores the technology gap among African American females. Twenty interviews will be conducted to understand the dialectics in technology use, access, and skills among minority women. Determining these tensions from the viewpoint of African American women extends the literature on relational dialectics theory and provides an understanding of the digital divide among African American females.

##### **01.06.02 Promoting Higher Education among Business Disciplines for Women**

**Clinton, M. Suzanne** *University of Central Oklahoma*

**Baskin, Meagan** *University of Central Oklahoma*

**McKee, Dr. Victoria** *University of Central Oklahoma*

**Merritt, Kimberly** *Oklahoma Christian University*

Although the numbers of males and females that achieve undergraduate and masters degrees are approximately equal at the undergraduate and masters level, males achieve business doctorates at a rate 1.36 times that of their female counterparts. The focus of the research included how to: encourage undergraduate females to seek higher education, actively recruit women into higher education, and how we, as educators, can promote and encourage women to achieve higher education degrees. Faculty can encourage undergraduates to seek higher education by identifying the high-achievers in our classes, mentoring them, giving input into possible schools to apply to, providing guidance for admissions exams, working with them on admissions packets, and providing letters of recommendation. Active recruitment of women into higher education could include sharing with women the benefits of working in higher education, providing realistic job previews of the work world that is higher education, welcoming them to attend discipline-specific conferences, and inviting them to co-author conference presentations and papers. As educators, we can promote and encourage women to achieve higher education degrees by supporting one another throughout the challenging journeys of our educational achievement.

### **01.06.03 High-Impact Transformative Learning Techniques: Learning by Working**

**McKee,Dr. Victoria** *University of Central Oklahoma*

**Baskin,Meagan** *University of Central Oklahoma*

**Clinton,M. Suzanne** *University of Central Oklahoma*

Many emphasize the importance of service or transformative learning in education, and several address its incorporation outside the classroom. However, few have offered specific manageable, useful guidance on its incorporation into the curriculum within the classroom. The authors will attempt to provide guidance on how to achieve transformational learning in the classroom by defining service learning, providing examples of service learning in the classroom, discuss the challenges of implementing service learning, and immediate feedback techniques used in the class room.

### **01.06.04 Retention and Research, Creative, & Scholarly Activities Grant Program**

**Greene,Nautica** *University of Central Oklahoma*

**Clinton,M. Suzanne** *University of Central Oklahoma*

**Rassouli-Currier,Susanne** *University of Central Oklahoma*

Once a semester or academic year is finished, some college students contemplate whether or not they will return to college. The students who decide not to attend college next year have significant reasons for separating themselves. Our research aims to improve retention in general, and to improve retention specifically at the University of Central Oklahoma. Through journal research, the authors have found various activities that can help improve retention: e.g. social support for minorities who don't feel welcomed; out-of-class (OCC) to help students keep relation with professor; Supplemental Instruction (SI) which helps students with note taking, graphic organization, test preparation, and etc. The authors' next steps are to attempt to identify specific reasons UCO separate themselves from the university by asking UCO students directly. Primary research questions will include the following: 1. If you decided to leave UCO and attend a different college what would be the closest reason for transferring? (choice of major, distance from home, cost, pursuing advanced degree, etc.). 2. If you decided to leave college in general, what would be your reason for leaving? (finance, family issues, stress, health problems, etc.). 3. What improvements should UCO do to keep future students from leaving? (improvements in: advisement, professors, parking, housing costs, scholarships, etc.).

#### **01.06.05 Research, Creative, & Scholarly Activities Grant Program: Improving Retention, Research Skills, Academic Conferences and Mentorship**

**Greene,Nautica** *University of Central Oklahoma*

**Clinton,M. Suzanne** *University of Central Oklahoma*

Research, Creative, & Scholarly Activities Grant Program, or RCSA, is a project that deals with a student(s) and professor(s) doing research to address mutual issues of importance. My grant is housed in the College of Business and the Department of Management. However, since my mentor is the Assistant Dean for Recruitment and Retention within the College of Business, we chose to study factors that positively influence business student retention. Retention is the ability to keep something, and we are attempting to identify ways to keep students in the College of Business. Co-authoring RCSA grants is one of the methods we can use to improve retention. Being an RCSA protégé prepares me for future research and internships within my majors. Due to my RCSA grant, I can grow as a research assistant and develop a connection with my mentor(s) and professor(s) which can lead to better opportunities for me. The connection I have with my mentor is strong. She tells me about different events, conferences, scholarships, etc.. I have attended Transformative Learning Conferences, Regional Universities' Research Day Conferences, and presented at the Collegium on College Teaching and Practice. Also, I have developed new skills from being a research assistant. Further, my research will assist in retaining current and future College of Business Students.

#### **01.06.06 Strategic Choice vs. Environmental adaptation**

**Manral,Lalit** *University of Central Oklahoma*

Our paper provides theoretical arguments as well empirical evidence to reconcile the two contradictory explanations of the relationship between firms' intra-industry exit and the evolution of their geographic scope: (a) intentional exit and ex ante scope, and (b) inadvertent exit and ex post scope. Our theoretical explanation originates at the intersection of two streams within the interdisciplinary literature on industry evolution – industry dynamics and sub-market dynamics. We conceptualize the industry dynamics in terms of increasing demand and increase in the number of geographic sub-markets available for entry. We conceptualize sub-market dynamics in terms of demand-side heterogeneity of the independent geographic sub-markets.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **01. Business Administration**

#### **07. Marketing**

##### **01.07.01 A Comparison of the Influence of Persuasive Message Appeals on Asian and U.S. Consumers**

**Sims, Jeanetta** *University of Central Oklahoma*

**Lai, Hung-Lin** *University of Central Oklahoma*

**Neese, Ashley** *University of Central Oklahoma*

Persuasive promotional appeals have long been incorporated into marketing messages. Using a 4 x 2 factorial design with 300 participants and messages featuring Apple-branded student apps, this research examines the effectiveness of fear, sex, and product appeals on two different consumer groups. Also, the investigation explores the influence of two different media modalities on Asian and U.S. consumer perceptions and purchase intentions. Understanding the differing impact of promotional appeals on Asian and U.S. consumers extends marketing and persuasion literature and improves the implementation of marketing strategy.

##### **01.07.02 Buy and sell on eBay: The effects of reviews and rating on consumers' willingness to pay when buying from other consumers on consumer-to-consumer platforms.**

**Nguyen, Huong** *University of Central Oklahoma*

Online platforms (such as eBay) allow consumers to sell and buy various products. In this consumer-to-consumer (C2C) market, buyers rely heavily on others' reviews and ratings when making purchase decisions. This project investigates (1) how reviews and ratings affect consumers' willingness-to-pay when buying from other consumers, and (2) how this effect depends on (a) consumers' price sensitivity, and (b) the type of product, i.e., used/refurbished vs. new products.

### **01.07.03 Exploring Adolescent Reactance to Stealth Marketing Campaigns**

**Sims, Jeanetta** *University of Central Oklahoma*

**Neese, Ashley** *University of Central Oklahoma*

Stealth marketing campaigns involve front groups or third party messages sent on behalf of companies in order to benefit the company or the company's products. Using a 4 x 3 factorial design with 360 participants, this research examines the effectiveness of stealth marketing campaigns and various message media on consumer perceptions and purchase intentions. Understanding the persuasive impact of stealth campaigns on consumers extends marketing and persuasion literatures and improves the implementation of marketing strategy.

### **01.07.04 Taco Bell's Live Mas Campaign: Lessons on How to Regain Consumer Interest**

**Sims, Jeanetta** *University of Central Oklahoma*

**Sewell, Kayla** *University of Central Oklahoma*

**Pham, Tuan** *University of Central Oklahoma*

**Cedillo, Alexis** *University of Central Oklahoma*

**Byrd, Jennifer** *University of Central Oklahoma*

Persuasive communication campaigns are a series of interrelated messages, which appeal to specific audiences in an effort to accomplish a specific goal (Pfau & Parrott, 1993). The purpose of this research is to provide insight on Taco Bell's Live Mas rebranding campaign. The communication elements of Taco Bell's campaign consisted of a new tag line, new commercials, new products, and the use of social media among other marketing activities. Examining the strategies associated with this campaign can help marketing practitioners regain lost consumer interest and extend reach to new consumer markets.



### **01.07.05 Dove's Real Beauty Campaign: Strategies for Building Relationships and Resonating Brands with Women**

**Sims, Jeanetta** *University of Central Oklahoma*

**Henson, Anna** *University of Central Oklahoma*

**Vo, Cindy** *University of Central Oklahoma*

**Nguyen, Minh-Hang** *University of Central Oklahoma*

Interpersonal relationships are an integral part of the discrimination stage of receiver decision-making processes in persuasive communication campaigns (Pfau & Parrot, 1993). Incorporating interpersonal elements can be a successful strategy for campaign success. The purpose of this research is to provide a descriptive examination of the Dove "Real Beauty" campaign. This campaign targets women and employs strategies designed to appeal to a wide variety of women. In an era where consumers are more interested in brands that resonate with their values, this campaign provides insights for practitioners seeking to generate greater connections between consumers and brands.

### **01.07.06 Sonic, Two Dudes, and a 10-Year Campaign: Insights on Being Relatable and Building a Brand**

**Sims, Jeanetta** *University of Central Oklahoma*

**Rudolph, Brittany** *University of Central Oklahoma*

**Kizzia, Savannah** *University of Central Oklahoma*

**Dykes, Brad** *University of Central Oklahoma*

**Williams, Danielle** *University of Central Oklahoma*

Persuasive communication campaigns are often executed over a series of time that extends across multiple years (Pfau & Parrott, 1993). The purpose of this research is to provide a historical examination of Sonic's 10-year "Two Guy's" campaign. This campaign consists of two comedic "Mr. Dude's" hanging out and having a conversation about Sonic's products, drive-in, and promotions. This analysis provides insights for marketing professionals interesting in making messages relatable and building brands through 'slice of life' strategies.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

## **02. Education and Professional Studies**

### **01. Education**

#### **02.01.01 Assistive Technology in a Diverse Classroom**

**Nguyen,Julie** *Cameron University*

This poster will explore how to use assistive technology inside inclusive classrooms. Assistive technology is useful for disable and non-disable students. My poster will explore the possibilities of using different types of assistive technology to enhance educational learning for every student. Since classrooms are becoming more diverse and inclusive, teachers need to diversify their portfolio and teaching techniques.

#### **02.01.02 Comparison of Combined and Sequential Physical and Vocal Training for Parkinson's Disease**

**McGloster,Danielle** *University of Central Oklahoma*

**Loftiss,Migmar** *University of Central Oklahoma*

**Olsen,Dr. Jacilyn** *University of Central Oklahoma*

**Sealey-Holtz,Dr. Linda** *University of Central Oklahoma*

Purpose: A pilot study on Combined Physical and Voice Therapy for Parkinsons Disease (PD) provided evidence that simultaneous training of voice and physical fitness improved functional fitness, balance, and select speech components in adults with PD. The purpose of this study was to compare the outcome measures from that simultaneous voice and physical fitness group treatment to those obtained in sequential group treatment of voice and physical fitness among individuals with Parkinson's disease (PD). Methods: The sequentially delivered treatments were order balanced with two groups: voice-first (VF) and physical-first (PF). In the VF treatment program a group of 7 participants received 50 minutes of voice treatment followed by 50 minutes of physical fitness treatment three times per week for four weeks. In the PF program another group of 7 participants received 50 minutes of physical fitness treatment followed by 50 minutes of voice treatment three times a week for four weeks. The voice exercises included standard clinical voice treatment tasks; warm-up, sustained phonation, pitch glides, repetitive production, cognitive task, and choral recitation. All outcome measures were similar to those obtained in the pilot study, simultaneous, comparison group. Treatment efficacy and 'improvement' was judged by comparing the pre-and post- treatment voice measures involving stress level, maximum phonation time, maximum phonation dB, conversational dB, reading dB, count

### **02.01.03 The Purposes and Practices of Capstone Experiences at a Masters Level Institution**

**Nelson, Mike** *University of Central Oklahoma*

**Cunliff, Ed** *University of Central Oklahoma*

**Powers, Dr. Melissa** *University of Central Oklahoma*

**Skelton, Elle** *University of Central Oklahoma*

**Patel, Akash** *University of Central Oklahoma*

The goal of this project was to gather information and report on current practices and ideas related to the capstone experiences of Masters students at the University of Central Oklahoma. While most evidence supporting high-impact practices, such as capstone experiences, has been conducted at the undergraduate level and most discussions of improving students outcomes in graduate school have focused on doctoral degrees, we suggest it is time to evaluate capstone experiences at the Masters level. Invitations to participate in one-on-one interviews were sent to graduate program coordinators at the University of Central Oklahoma. Program coordinators were asked: (a) to provide a personal definition of a capstone experience, (b) to address the capstone requirements for their program and how the capstone experience prepares students for the workforce, (c) to identify the knowledge, skills, and abilities that students should obtain during their graduate program, and (d) to describe possibilities, other than the current capstone, that might better meet the needs of students. Program coordinators were asked to provide a copy of the criteria, directions, and assessment tools (i.e., rubric or checklist) for the capstone experience. Data is currently being analyzed and preliminary findings will be presented at the poster session.

### **02.01.04 An investigation of the effectiveness of interactive whiteboard technology in a hearing impaired preschool classroom**

**Benson, Susan** *University of Central Oklahoma*

**McCarthy, Molly** *University of Central Oklahoma*

With advances in technology, educators have new teaching tools available. One such tool is the interactive white board (IWB). Increasingly, instructional materials, novel as well as those incorporating a blending of existing curriculums, are being developed for use with IWBs for both typical learners and individuals with special learning needs. IWBs are easily accessible to all learners (even those with cognitive and physical disabilities), are simple and intuitive for children to use, and can present larger than life stimuli. Numerous scholarly review articles, white papers, anecdotal reports, and descriptive studies describe the uses of the IWB and its effectiveness in targeting both affective and cognitive domains. However, the effectiveness of IWB technology in instructing young children with hearing impairment has not been explored. Therefore, the purpose of the proposed study was to investigate the effectiveness of an interactive whiteboard in the delivery of instruction to preschool-age children with hearing impairment. A single subject design was employed to compare the effectiveness of the IWB in increasing on-task behavior during instruction with traditional instruction during which an IWB is not used. Results of the study add to the extant literature investigating early intervention instructional practices for young children with hearing impairment.

## **02.01.05 A Study of Public School Playground Quality in Southwest Oklahoma**

**Caughron,Katie** *Cameron University*

**Hilbert,Dana** *Cameron University*

The Center for Disease Control (CDC) recommends all children should have at least sixty minutes of physical activity per day. State licensed child care facilities serving young children must follow regulations concerning outdoor equipment and opportunities for developmentally appropriate play. Public school settings that educate young children do not have specific mandates concerning outdoor equipment. The purpose of this research was to examine the quality of the outdoor equipment and experiences available for young children attending public school in southwest Oklahoma. The quality of the outdoor equipment and experiences were assessed using portions of the Early Childhood Environmental Rating Scale (ECERS), the Consumer Product Safety Commission (CPSC) standards and the State Department of Human Services standards. Data reveals that none of the schools met all of the safety and quality standards. 1) Three of the twenty-three public elementary schools met the DHS safety standards. 2) Six of the twenty-three schools met the CPSC standard of having distinct areas for young children. 3) None of the schools met the ECERS fall zone minimums. These findings suggest that public school outdoor play areas do not meet safety standards or equipment requirements for young children. Children need age-appropriate and safe outdoor structures and opportunities to foster their play and outdoor activity.

## **02.01.06 Administrator Perspectives on the Year-Round School Calendar**

**Adegoke,Adelekan** *East Central University*

**Beakley,Logan** *East Central University*

**Butcher,Talitha** *East Central University*

One of the most prominent issues emerging in local government is the move to year-round public education. The purpose of this study is to investigate whether current Oklahoma administrators think that switching from a traditional school calendar to a year-round school calendar would have positive effects on student achievement as well as other issues currently facing Oklahoma schools. The survey will be administered via email to public school administrators throughout various regions of the state of Oklahoma. The instrument used in this research project is a 33 question survey, including multiple choice questions and check box questions for multiple answers and will take approximately 10-15 minutes to complete. An email to school administrators will be sent out, containing the link to the online survey. The respondent must give voluntary consent to participate before having access to the survey. Data analysis shows that when discussing the specific areas in which administrators believe a year-round school year could be beneficial, student retention (50%), burnout (45%) and increased remedial classes offered (38%) were the most prominent with teacher retention (15%) being the lowest. In conclusion, 60% of the administrators surveyed in the state of Oklahoma stated that they would consider switching from a traditional school year calendar to a year-round calendar.

## **02.01.07 Grammar Knowledge and Instructional Methodologies in Oklahoma Speech- Language Pathology Curriculum**

**Humphries,Michael** *University of Central Oklahoma*

**Jones,Megan** *University of Central Oklahoma*

**Benson,Susan** *University of Central Oklahoma*

Accredited graduate programs in speech-language pathology (SLP) must insure that SLP graduates enter the work force with the knowledge and skills to achieve certification and to serve as qualified and competent professionals. Grammar is considered a core knowledge area for speech-language pathologists (SLPs). However, SLP graduates have expressed a belief that they do not have a knowledge basis or skills to work with grammar structures (Blood, Mamett, Gordon, & Blood, 2010). In light of this documented belief, investigation aimed at improving instructional practices is warranted. In an effort to improve existing instructional practices, this study explored the information processing principles of feedback and formative assessment in the form of comprehension questions embedded within an online instructional e- learning module. Specifically, we investigated (1) the current grammar knowledge exhibited by SLP students across three instructional groups (junior/graduate applicants, seniors, and first year graduates); and (2) the efficacy of an e-learning instructional module utilizing formative assessment with first year graduate students. This study employed both cross-sectional and longitudinal designs.

## **02.01.08 Error Analysis of Spontaneous Language Samples from Language-Impaired Bilingual Children**

**McKaig,Michael** *University of Central Oklahoma*

The purpose of this study was to investigate the English and Spanish language errors of normally developing and language impaired bilingual children. Language samples of English and Spanish were elicited from 40 bilingual children, including 10 language impaired children. The grammatical errors of each subject group were analyzed and percentages of correct production were calculated. In addition, mean percentages of the most frequent error types were tabulated. It was found that the language impaired subjects produced more errors than did the normal subjects. In addition, differences in error patterns clearly distinguished between the language impaired and normal subject groups.

## **02.01.09 Leadership as Accelerating Identity: Exploring a Leader Development Model**

**Sims, Jeanetta** *University of Central Oklahoma*

**Cunliff, Ed** *University of Central Oklahoma*

**Robertson, Kristi** *University of Central Oklahoma*

**Tyler, Karl** *University of Central Oklahoma*

**Thomas, Masala** *University of Central Oklahoma*

**Dykes, Brad** *University of Central Oklahoma*

Too often notions of leadership in higher education involve colleges, divisions, and administrative units as well as the complexity of to-do lists and other activity generators with little regard for individual journeys or identity constellations (Sims, Cunliff, Floyd, Neese, Shuff, and Sims 2014). Yet, as one leading chemistry faculty member and research participant (Jordan Tang, in-person interview with authors, May 1, 2013) suggests, longevity in the Academy is best achieved when individuals lead from places of personal passion rather than ambition or activity. Through educator interviews, this investigation probes the characteristics of authentic leaders in higher education to distill a multi-faceted model that can assist faculty in achieving their own leadership identity in academia.

## **02.01.10 Developing an Authentic Leadership Model for Accelerating Educator Identity**

**Tyler, Karl** *University of Central Oklahoma*

**Cunliff, Ed** *University of Central Oklahoma*

**Sims, Jeanetta** *University of Central Oklahoma*

**Robertson, Kristi** *University of Central Oklahoma*

**Dykes, Brad** *University of Central Oklahoma*

**Thomas, Masala** *University of Central Oklahoma*

In an exceedingly tumultuous world, much disdain and mistrust of organizations and their leaders have worked to generate significant buzz on the subject of authentic leadership (Northouse, 2013). This approach to leadership focuses on genuine leaders who are reflectively conscious in knowing themselves as well as the manner in which they approach their work. The current study extends a previous investigation by analyzing extensive interviews with educators considered by their peers to be accomplished leaders in higher education. The purpose of the study is to identify educator leadership qualities that can distill a model capable of promoting leadership longevity. Through the integration of three theoretical frameworks (relational dialectics, authentic leadership, and organizational diversity), two research questions related to leadership facets are explored using interviews with educators, mentees, and colleagues. Interview transcripts were analyzed for key themes based on grounded theory, a constant comparative analysis (Glaser & Strauss, 2006).

## **02.01.11 The Power of Presence: 2-D in a 3-D World**

**Hawkins, Joshua** *Northwestern State University*

**Widick, Stephanie** *Northwestern State University*

The world of education is changing. The changes are not merely philosophical and political, they are also quite practical. Technology has enabled education to be accessed through various modalities and mediums including online and other multimedia forms (Kumar, 2012). In higher education, the centrality of the teacher in what was once the traditional classroom now appears an outmoded form with increasing emphasis put upon the student as a regulator of learning. Teachers in these various new classroom formats are often reduced to either a 2-dimensional figure on a screen or simply a name—the proverbial “man behind the curtain” coordinating the delivery of content and other educational exercises. Certainly, self-regulated learning is beneficial (Schunk & Zimmerman, 2008). However, research almost uniformly supports the importance of positive student-teacher relationships in relation to outcomes including engagement, motivation, and achievement (Klem & Connell, 2004). The current exploratory study investigates undergraduate and graduate students’ perceptions of relatedness to the instructor where instruction is delivered jointly between in-class and distal sites as mediated through interactive television (ITV). How does the presence (or absence) of the instructor affect perceptions of relatedness? Preliminary content analysis of data collected through semi-structured interviews indicates distinct differences in the perceptions of the participants

## **02.01.12 Receptive and Expressive Vocabulary in Low SES, Hispanic Learners**

**Johnson, Laura** *University of Central Oklahoma*

**Rittner, Dr. Linda** *University of Central Oklahoma*

**Jones, Megan** *University of Central Oklahoma*

The purpose of this study was to investigate the relationship between working (expressive and receptive) vocabulary in ESL, Kindergarten students and third grade students retained for unsatisfactory reading test scores, based on a state assessment. Students were assessed using the Peabody Picture Vocabulary Test and the Expressive Vocabulary Test. Using a Midwestern US school with a low SES and high Hispanic population, this study investigated randomly assigned students’ receptive vocabulary, beginning in Kindergarten and compared them to third grade retained students and first semester fourth grade (promoted) students to ascertain standard score differences. While results are mixed, there is an effect of working vocabulary growth based on incoming scores.

## **02.01.13 Assessing Research Skills of First Semester Freshmen at Northeastern State University**

**Woitte, Susan** *Northeastern State University*

**McCay, Kathleen** *Northeastern State University*

**McLane, Chad** *Northeastern State University*

**Standley, Olaf** *Northeastern State University*

**Hoenes, Richard** *Northeastern State University*

The purpose of this study was to assess the information literacy assignment within the first year transition course at Northeastern State University to determine if students are learning to evaluate a website and select an appropriate database for their needs, and thereby partially fulfilling one of NSU's general learning objectives "to be able to evaluate the reliability and comparative worth of various information." Each student was given the same 20-question pre and post survey that required them to select a searching tool for a particular information need and to evaluate two websites. The pre-survey was given within an online module with instruction videos. After the online experience, students attended a face-to-face class session in the library with a librarian. The post-survey was delivered during the 15th week of the semester. Our results show that the students believe they learned how to evaluate websites, but they were not able to fully apply the skill to the survey example. We also found that students' ability to select the most appropriate database for a stated information need improved.

## **02.01.14 OSHA Mandated Hazardous Communication for the Visually Impaired Employee**

**brown, guy** *University of Central Oklahoma*

OSHA Mandated Hazardous Communication for the Visually Impaired Employee Guy Brown, University of Central Oklahoma Industrial Safety, CEPS According to National Industries for the Blind, in America seventy percent of the employable, visually impaired population is currently un-employed. Due to my personal exposure to NewView Oklahoma (NVO), an Oklahoma based manufacturing facility that is associated with National Industries for the Blind; I quickly realized that current industry standards for hazardous material communication were virtually un-accessible to the blind or visually impaired worker. I decided to create a safety communication program format that was tailored to the visually impaired workers of this country. Working with NVO I researched what technology is currently being used to assist the visually impaired, and what the actual visual capabilities of their work force are. I have been able to format OSHA compliant documentation that is both visually compliant with accepted high visibility print standards as well as being fully compatible with electronic assistive technology. Currently the system is scheduled for initial implementation during March 2016 at NVO's manufacturing facility located in Oklahoma City. Upon complete implementation the system will be composed of a fully accessible electronic system maintained on the company's intranet, a set of high visibility printed documents, a set of brail printed documents and oversized specialty warning



## **02.01.15 Selected Results of a Multi-State Survey on Technology Integration**

**McClanahan,Barbara** *Southeastern Oklahoma State University*

**Smith,Melinda** *Northeastern State University*

**Stout,Jerry** *Southeastern Oklahoma State University*

**Jensen,Dr. Crystal** *Southeastern Oklahoma State University*

Technology represents a significant investment for 21st Century schools. A survey completed by 1,309 teachers and administrators across three states was conducted to understand the perceptions of both groups as to how teachers used technology in their classrooms and their perceptions of the training they received for technology use. By cross-tabulating the data and analyzing for significance, the researchers were able to draw several conclusions including which groups of teachers preferred which devices, whether and how gender, years of experience, or grade level taught impacted certain preferences, and how much training was most closely related to the highest levels of implementation. An important finding related to professional development is that the benefit of having a technology presentation by an expert to a large group of teachers seems limited to about five hours; after that, teachers prefer more specific, within-classroom guidance by an in-house instructional coach. Although the survey revealed that elementary teachers use more technology, their use is more likely to be confined to substitution or augmentation. On the other hand, when high school teachers use technology, they are much more likely to use it in ways that are much better integrated.

## **02.01.16 Endangered Species Project: A Technology-Based Collaboration Between Middle Schools in Oklahoma and Pakistan**

**Crofford,Geary** *Northeastern State University*

**Iqbal,Hazel** *Other*

Woodall School 7th graders learned about the importance of protecting endangered species including those in foreign lands by completing a project in conjunction with 8th graders at Beaconhouse School System-Canal Side Girls' Campus in Lahore, Pakistan. The purpose was to help students discover, through technology and various sources, the causes of species endangerment in not only their own country, but in other countries around the world. The students researched and shared information, made mind maps, interviewed experts, conducted surveys, and created a final product for the project such as a poster or video. The project is designed for grades 6-8, takes three weeks to complete, and consists of six activities that encourage students to apply and share their knowledge through sites like Edmodo, an educational social network where educators and students from around the world can share and collaborate. Students completed assignments to help them better understand what animals in their area are endangered; what causes species endangerment; what can be done to help prevent it or raise awareness for endangered species and why conservation is important. This was an innovative opportunity to use technology provided by schools to connect with students from around the world. Endangered species are an important topic, but society demands we be global citizens. This project could have an even broader and long-term impact on children by introducing them to other cultures and people.

## **02.01.17 The Relationship of ACT Scores to OGET Scores**

**Hancock, Ken** *Northeastern State University*

**Landry, Debbie** *Northeastern State University*

This report looks at the relationship of the ACT and the OGET tests. Data was gathered from teacher education candidates during their Clinical I class for AY-2014 and AY-2015. Scores from 159 students were correlated using a Pearson r Correlation coefficient and tested for significance. The results indicate that there is a very strong relationship between the ACT and the OGET.

## **02.01.18 The Effect of an Educational Savings Account on the Equity of Distribution of Oklahoma's Common School Funding Formula**

**Hancock, Ken** *Northeastern State University*

This report looks at the effect on the equity of distribution that is provided by the Oklahoma common school funding formula if 5% of all current school children were to enroll in the proposed Educational Savings Account. The original simulation and four funding scenarios were created and used in the study using the information from Oklahoma's Annual Financial Report for public schools for SY-2014. Two measures of distribution equity, Pearson r correlation and a Restricted Range, were used to compare the four student funding scenarios. In each case, the equity of distribution was lower than the original scenario. The more money given per student for private education, the lower the ability of the funding formula to provide equity of distribution.

**Abstracts from the 2016 Oklahoma Research Day**

**Held at Northeastern State University**

**02. Education and Professional Studies**

**02. Family Science**

**02.02.01 Exploring the Dialectics in Latina Perceptions of Healthy Foods**

**Sims, Jeanetta** *University of Central Oklahoma*

**Shuff, Jalea** *University of Central Oklahoma*

Dialectics are the tensions navigated in relationships (e.g., love/hate, joy/anger). Through 20 interviews with Latina Americans, this project explores dialectics negotiated by women concerning food and related behaviors, which is an approach that has not yet been employed to discern the health perceptions of minority women. Identification of the tensions associated with Latina American perceptions and relationships with food improves health education among Latina Americans, extends relational dialectics theory, and enhances cultural health interventions.

## **02.02.02 Generations Learning Together: Pilot Study for Creating an Intergenerational Center**

**Bertram,Dr. Glee** *University of Central Oklahoma*

**Atkins,Dr. LaDonna** *University of Central Oklahoma*

**Powers,Dr. Melissa** *University of Central Oklahoma*

**Burr,Brandon** *University of Central Oklahoma*

**Sears,Dr. Kaye** *University of Central Oklahoma*

**Holmes Ph. D., R.D., L.D.,Tawni** *University of Central Oklahoma*

**Kambour,Tina** *University of Central Oklahoma*

**Kennedy,Ericka** *University of Central Oklahoma*

**Clear,Sherri** *University of Central Oklahoma*

In this age segregated society, generations need to spend time in meaningful activities to bring them closer. Our interdisciplinary team from two colleges at UCO worked together to plan and implement an enriching, intergenerational project with 4 year olds and senior adults. The intergenerational component also included college age students from classes in child development, dance, gerontology, kinesiology, and nutrition. The students played an active role in planning and facilitating activities through service class assignments. The intergenerational programming utilized a local church that has an onsite child care and a program for older adults. The overall objectives of this research included assessing perceptual change between the generations. Also, to see if the process of intergenerational programming was acceptable to the child care staff and parents. Our hypothesis was that perceptions would be more positive of older adults from the children and college students and that older adults would also see the younger generations more positively. Assessment techniques included assessing change from pre/posttest with college students, parents of children, childcare staff; pre-post interviews with the older adults; and teacher led guiding questions with the children. The findings suggest that the older adults, college students, and children had improved perceptions of the other generations. The staff of the child care was very positive about the programming.

### **02.02.03 Comparing Men and Women's Attitudes Towards Incentives for Attending Relationship Education**

**Kuns,Brooke** *University of Central Oklahoma*

**Burr,Brandon** *University of Central Oklahoma*

Research suggests that RE is effective with individuals and couples. RE can help build skills so couples can remain strong, however men and women's attitudes about RE may vary. More investigation is needed to effectively shape recruitment and marketing based on different attitudes. This study seeks to expand the literature by assessing men and women's views on preferred amounts of time and money spent on RE. The sample consisted of 2,349 individuals whose ages ranged from 18-75. This sample was a primarily Caucasian (75%) female (75%). 49% reported being married while 24% stated they were single. Over half (56.5%) had incomes up to \$50,000. Participants completed an online survey comprised of statements regarding attitudes towards preferred time and money to spend on CRE. Preferred time spent on CRE was measured using a scale from 0 to 10+ hours and preferred cost was measured on a scale from \$0 to \$100+. The amount of payment expected to receive for attendance (incentive) was measured on a scale from under \$25 to \$450+. Results of this study indicate that men report they are more likely than women to spend less time and money on relationship education. While research shows the effectiveness of RE, the recruitment process needs to cater to the specific needs of the audience. And since time and cost are such large barriers, learning about preferences in men and women can help to create more effective recruitment messages.

## **Abstracts from the 2016 Oklahoma Research Day**

**Held at Northeastern State University**

### **02. Education and Professional Studies**

### **03. Health Studies**

#### **02.03.01 Scoping Gastroenterology Journals: 100% of Meta-analyses Tested Positive for Publication Bias**

**Heavener,Trace** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

In systematic reviews and meta-analyses, publication bias (PB) is problematic, given that combining only statistically significant outcomes is likely to overestimate the true effect of an intervention since marginal or non-significant findings have been omitted. Therefore, we examined current practices for evaluating PB in systematic reviews from the gastroenterology literature and also assessed the extent to which PB was present among studies not reporting these evaluations. We performed a search which identified 304 studies. Of these, 215 were eligible for inclusion and coded based on relevant study characteristics. Meta-analyses that failed to perform a PB evaluation and contained greater than 10 primary studies were assessed for PB using Egger's regression and the trim and fill method. 52.56% (113/215) of studies reported assessing PB with the remainder failing to report any such evaluation. Of qualified studies that did not assess PB, we found evidence for PB in 100% (15/15) of studies. Based on our analysis, PB evaluations were not commonly performed as approximately 50% failed to conduct this analysis. While funnel plots were the most common assessment, their use has been questioned by systematic reviewers in favor of more robust methods. Furthermore, given that evidence for PB was found in all qualified meta-analyses, more attention in this area is greatly needed.

## **02.03.02 Effect of maternal antibodies on SCID screening in newborn**

**ALBUSTANI,MUSTAFA** *University of Oklahoma*

Introduction: In February 2015 Oklahoma state included TRECs as screening method for SCID in newborn screening. We report here case of false positive TREC due to Neonatal lupus erythematosus which is a rare passively acquired autoimmune syndrome resulting from the transplacental passage of maternal antibodies to the fetus. Case presentation: A five-week-old male, was brought to our clinic for evaluation of positive Trec screening. Patient was born to 30 year old mother who was known to have Sjogren's disease with +SSA antibody. He was initially sent to nursery, where he was noted to have blueberry muffin rash covering his body. Patient was transferred to NICU to rule out sepsis. Physical exam was within normal limit except for oval blueberry muffin like rash on pt scalp, face, back, feet and palm. The patient was diagnosed with neonatal lupus. Blood labs showed platelet count of 34 with normal hemoglobin and white cell count. Thrombocytopenia worsened over the following two days requiring IVIG treatment. Response was minimal, and he was given second dose of IVIG and started on parenteral steroids. Prior to discharge, newborn screening results came back with Trec of 9 (cutoff >26 Trec). A repeat screen and lymphocyte phenotyping was drawn. Lymphocyte proliferation was normal to mitogens PHA, Con A and PWM. FISH analysis of chromosome 22q11 was also normal, ruling out DiGeorge syndrome. Neonatal lupus and its therapy seems to have a deleterious effect on Trec screening.

## **02.03.03 Adherence to current Food Allergy prevention guidelines in practice**

**ALBUSTANI,MUSTAFA** *University of Oklahoma*

Background: According to the American Academy of Allergy, Asthma, and Immunology (AAAAI) and newest American Academy of Pediatrics (AAP) guidelines, highly allergenic foods, including milk, soy, wheat, tree nuts, and shellfish, may be introduced between four and six months of age once complementary foods have been fed and tolerated(1). Objective: We proposed that resident physicians are unaware of the change in guidelines and therefore the fact that early introduction of highly allergenic food to infants may protect against food allergy. Participants in this project include 53 residents completed a five-question survey to evaluate their general knowledge and awareness of the current food allergy guidelines and describe their current practice regarding the introduction of highly allergenic foods. Results: 42 residents completed the surveys. Around 73% of residents reported being familiar with current guidelines; only 28% of all residents correctly identified the recommended age for introduction of highly allergenic foods to the diet in infants. Conclusion: Data also suggest poor adherence to these guidelines in practice. These findings provide important information to guide strategies to improve prevention of food allergy in the pediatric age group.

## **02.03.04 Wissler-fanconi syndrome and associated differential diagnosis**

**ALBUSTANI,MUSTAFA** *University of Oklahoma*

Introduction: Wissler Fanconi, a rare rheumatic syndrome characterized by four typical symptoms; polymorphous exanthemas, fever, leucocytosis and arthralgia. It is considered closely related to Still's disease. We report a case that fulfills criteria for Wissler Fanconi syndrome. Under the more general descriptive umbrella of Wissler-Fanconi syndrome, our patient also fulfills the modified Jones criteria, the 2010 ACR/EULAR criteria for rheumatoid arthritis, and was interpreted by others as fulfilling the Yamaguchi criteria for Still's. Case presentation: A 42-year female presented with shortness of breath and chest pain for one week associated with two days of fever. Patient has polyarthritis and polymorphic rash on the back and lower extremities for four months. Physical exam revealed decreased chest expansion but no rales. CT chest ruled out pulmonary embolism, and revealed a pericardial effusion. Blood sample analysis revealed highly elevated CRP, ESR and Ferritin of 29349 ng/ml, rheumatoid factor 146 IU, CCP Ab 20, ASO titer 179. A combination of naproxen, dapsone and steroid therapy resulted in significant improvement of patient's condition. Patient was discharged with diagnoses of rheumatoid arthritis and rheumatic fever. Adult onset of stills disease was considered in the differential but patient failed to fulfill Yamaguchi criteria. Conclusion: This case highlights important differential diagnoses that may be included under the umbrella of Wissler Fanconi syndrome.

## **02.03.05 Strength Training Intervention and Falls in Old Subjects Aged 60+ Years Old: Systematic Review**

**Hernandez Sarabia,Jesus** *Oklahoma State University*

Falls expenses accounted for \$47 billions during 2010 in the United States of America. At least 33% of the elderly population tend to fall during a year, and projection about the future is not optimistic. Resistance training may help to improve factors related to falls (sarcopenia, balance, and gait). The aim of this review was to show the findings related to resistance training and falls among elderly subjects during the last five years. A search of relevant articles was done in SPORTDiscus, PubMed Central, Medline, Google scholar, and EBSCO: Health source: Nursing/Academic edition. Articles that made a resistance training intervention with healthy subjects (60+ years old) and with a repeatable methodology were included. Eight articles were included but two of them did not show any significant improvement, three authors found significant improvements in the strength of the lower limbs, two in gait and ability to recover from falls, and one in balance. Resistance training may help to improve the strength, balance, and gait in elderly population but more research is needed.



### **02.03.06 The Effect of High-Intensity Interval Training on Postural Control, Dynamic Balance, and Muscular Strength among Older Adults**

**Ross, Antonio** *University of Central Oklahoma*

**Boyd, Larissa** *University of Central Oklahoma*

**Ward, Jordan** *University of Central Oklahoma*

Researchers determined that muscle weakness and poor balance are associated with increased fall risk. High-intensity interval training (HIIT) has shown benefits in muscular strength. **PURPOSE:** To determine the effects of HIIT on postural sway, dynamic balance, and lower body strength among active older adults. **METHODS:** The experimental group (EG) participated in the 4-week intervention. The control group (CG) continued their normal lifestyle. Participants completed different timed interval bouts. Participants were assessed on postural sway with eyes open (EO) and eyes closed (EC). Dynamic balance and lower extremity strength was measured. The Wilcoxon Sum of Ranks test was utilized to test for within groups' differences. A Mann-Whitney U determined differences between groups. Cohen's d (d) measured the magnitude of the difference. **RESULTS:** Postural sway did not indicate any significant improvements with eyes open stances. The experimental group did show improvement ( $d < .30$ ) with eyes open. The eyes closed stances in the EG showed three significant improvements and magnitudes of improvement. The control group did not. Significant improvements were found in both dynamic balance and strength assessments. The Mann-Whitney indicated significant improvements ( $p = .04$ ) and approached significance for strength ( $p = .067$ ). **CONCLUSION:** HIIT significantly improved dynamic balance and muscular strength. HIIT change over time in EC and EO stances.

### **02.03.07 Fortification of Navy Bean Extract Decreases Fermentation Time and Enhances Overall Quality of Yogurt**

**Ita, Maureen** *University of Central Oklahoma*

**Bhargava, Kanika** *University of Central Oklahoma*

**Gamagedara, Dr. Sanjeewa** *University of Central Oklahoma*

Fermented milk products such as yogurt are one of the most popular probiotic products that offer health benefits due to functional properties of active probiotic bacteria. Pulses, including bean, pea and lentils are good sources of prebiotics, which offers potential to increase quality of yogurt and benefit health. The aim of this study is to evaluate the effect of the navy bean extract on the fermentation time and overall quality of yogurt. Navy bean extracts were prepared to isolate maximum amount of raffinose oligosaccharides. 10g of bean flour was mixed in 100ml of distilled water and incubated overnight at 70°C. Mixture was centrifuged at 1500rpm for 15 mins and supernatant separated. 2.5%-10% of navy bean extracts were fortified in 2% reduced fat milk, pasteurized at 90°C for 10 mins, cooled to about 42°C and then inoculated with yogurt culture (Danisco YO-MIX 883 LYO 500 DCU) and fermented for 4 – 8 hours at 42°F. Physicochemical analysis was carried out. Results showed that yogurt samples fortified with bean extracts reached the desired pH (4.5) within 4-5 hours, total soluble solids in fortified yogurt showed an increase from 5.3 to 6.06°Brix, titratable acidity of yogurt increased from 0.275% (control) to 0.725% (10%) with increase in bean extract concentration. Results may be attributed to the presence of the prebiotic raffinose oligosaccharides, which is found in beans. Future work will be focused on quantification of raffinose oligosaccharide concentration.

## **02.03.08 Formulation, Nutritional and Sensory Analysis of Coffee Fortified Organic Semolina Protein Bar**

**Simo, Jean** *University of Central Oklahoma*

**Bhargava, Kanika** *University of Central Oklahoma*

A major challenge in the fight against obesity is a lack of alternative nutritious and organic food sources. Semolina and Lentils are high in protein making it an ideal substitute to flour and the base of our formulation. The purpose of this research is to optimize semolina/lentils to create a protein bar that is fortified with instant coffee. Organic protein bars made from semolina or lentils may serve as alternative protein source as well as a coffee substitute, which is healthier than what the market currently provides. Formulation and process for these coffee protein bars have been optimized after trial with several recipes. The four main ingredients used were semolina/lentils, egg whites, date syrup, and coffee. Semolina/Lentil was roasted, mixed with the other ingredients and baked for 20 mins at 350 degree to decrease moisture content and increase shelf life. Next was adding varying concentrations of caffeine (75mg, 100mg and 125mg). The coffee fortified protein bar will be characterized through moisture content, texture and nutritional analysis. Our current optimized product comprises of 270.38 Kcal and 8.147g protein. Our goal is to decrease the kcal and increase protein content. Protein rich nuts such as almonds and walnuts will be added to achieve this goal. Flavors like cinnamon and cardamom may be added to enhance taste. This research will provide food companies and consumers with an alternative organic protein bar, which is fortified with coffee.

## **02.03.09 Breathe Smart from the Start: A STLR Project Impacting the Metro through Culturally Sensitive Tobacco Prevention and Cessation Education**

**Gilmore, Danielle** *University of Central Oklahoma*

**Cowan, J. Sunshine** *University of Central Oklahoma*

Oklahoma's tobacco use is much higher than the national average, as 23.7% of Oklahomans smoke, compared to the national smoking rate of 17.8%. Smoking tobacco causes chronic illness and cancers, killing thousands each year. Through this Student Transformative Learning Record (STLR) Project at the University of Central Oklahoma, research has been compiled to update the American Lung Association's (ALA) program Breathe Smart from the Start, a tobacco cessation program specifically targeting pregnant women and new moms. Tobacco use is the number one cause of preventable death in the US, and millions of dollars each year are spent on tobacco related illness and disease (Campaign for Tobacco Free Kids, 2015). Oklahoma is the only state currently using this program, and it is crucial that it remains up to date. It is important to foster and encourage positivity while still continuing to be provide credible and accurate information. Additionally, an implementation plan has been developed for the ALA to use with community partners to reach target audiences for tobacco prevention and cessation. The goal of this project is to present culturally sensitive information in an innovative and captive way for the purposes of prevention and tobacco cessation without causing shame or victim blaming. Campaign for Tobacco Free Kids. (2015). The Toll of Tobacco in Oklahoma. Retrieved from [http://www.tobaccofreekids.org/facts\\_issues/toll\\_us/oklahoma](http://www.tobaccofreekids.org/facts_issues/toll_us/oklahoma)

## **02.03.10 Confession Rates: Does Persuasion Resistance Time Reduce Them?**

**Dugger, Karissa** *University of Central Oklahoma*

**Mather, Robert** *University of Central Oklahoma*

Confessions are given every day in criminal investigations across the country; countless are true confessions, but there are many false confessions, as well. This study will evaluate participants on their confession rates, whether innocent or guilty, during an experiment that challenges their persuasive resistance when time is given to collect their self-control resources. Resistance to persuasive acts can reduce the rate of true and false confessions. The first hypothesis is that the guilty participants will confess to cheating more than the innocent participants. The second hypothesis is that the participants that receive time to collect their self-control resources will give fewer confessions than those who do not receive time, despite actual guilt or innocence. The third hypothesis is that innocent participants with the time to collect their self-control resources will yield the fewest confessions. This study will use the Russano et al. (2005) paradigm with time given to half of the participants to test the hypotheses. The results from this study can potentially help courts and law enforcement understand how providing a little time to the accused to clear their thoughts before interrogation could avoid incarcerating the wrong person.

## **02.03.11 Utilization of Social Network Analyses to Reveal Central Outcomes in Clinical Trials of Hyperemesis Gravidarum**

**Rankin, Justin** *Oklahoma State University*

**Umberham, Blake** *Oklahoma State University*

**Carr, Brandon** *Oklahoma State University*

**Sanchez, Zachary** *Other*

**Naumann, Kelsey** *Oklahoma State University*

**Holzmann, Matthew** *Oklahoma State University*

**Vassar, Matt** *Oklahoma State University*

Core outcome sets – a minimum set of outcomes recommended for measurement across all trials of a particular condition – harmonize and address widespread variations in outcomes reporting. Development of a set of core outcomes for clinical trials and systematic reviews is necessary in obstetrics and gynecology to minimize bias and mitigate the heterogeneous nature of outcomes measured in research studies. In order to address this important and timely issue, 50 obstetrics and gynecology journals came together to establish the CROWN Initiative to promote core outcome studies. The aim of this study is to examine the network architecture of outcomes reported in clinical trials of hyperemesis gravidarum and to demonstrate the overall lack of consistent outcomes throughout the trials included in our study. We examined 120 clinical trials of hyperemesis gravidarum from 2006 to 2015. Unique outcomes were coded based on the number of co-occurrences they shared with other outcomes. A social network analysis was performed on the coded outcomes using UCINET and Netdraw. The social network analysis revealed 56 unique outcomes with numerous co-occurrences. Length of hospital admission had the most co-occurrences (42) followed by ketonuria, vomiting frequency, and well-being. The results indicate the necessity for core outcomes to be established. The results of the network analysis will guide future methodological work toward the development of a core outcome set for hyperemesis.

## **02.03.12 Formulation, Optimization, and Consumer Acceptability of Finger Millet Tortillas**

**Shakya,Kritika** *University of Central Oklahoma*

**Dr. Duarte,Patricia** *Oklahoma State University*

**Hernandez,Zorba** *Oklahoma State University*

**Bhargava,Kanika** *University of Central Oklahoma*

Researches has shown potential health benefits of finger millet in many health conditions due to its nutritional content. However, absence of gluten in it inhibits binding property required to formulate tortillas. The objective of the study is to formulate, optimize, and perform the consumer acceptability study on the finger millet tortillas. We formulated a flour composition using USDA's standardized tortilla recipe consisting of finger millet and chickpea flour at the ratio of 7:3 respectively. We further optimized it with 2% sugar, 4% of glycerin and 15% of starch (rice, potato, and tapioca) to elevate functional and sensory properties. A sensory panel was trained and taste testing was conducted using a descriptive analysis tool to evaluate consumer acceptability, texture and flavor of the tortillas. The overall textural acceptability was significantly high for tortillas made with tapioca and rice but overall acceptability was high for potato starch. The high acceptability of tortillas with potato starch is correlated with flavor analysis that showed it was less bitter, less salty and sweeter. The results indicated that incorporation of potato/rice starches may result in formulation of finger millet tortillas with acceptable textural and sensory properties which would be a nutrient dense alternative to traditional tortillas for people with celiac disease and a potential medicinal food for people with diabetes. Keywords: Finger millet, Celiac disease, Tortilla, Starch

## **02.03.13 A Systematic Review of Core Domain and Outcome Measurement for Shoulder Arthroplasty Trials**

**Sims, Matt** *Other*

**Detweiler, Byron** *Other*

**Scott, Jared** *Other*

**Detten, Grant** *Other*

**Vassar, Matt** *Other*

Orthopedics offers multiple interventions yet lacks consistency in outcome reporting and measurement. Without standardized core outcome set (COS), formulating research evidence that will influence policy, practice and patient care is difficult. Corrales et al identified 11 different radiographic and 12 different clinical criteria defining fracture union. This variability confirms the importance of COS development for orthopedic interventions in defining the minimum recommended outcomes for measuring a condition. Recent systematic reviews (SR) found increased shoulder arthroplasty research; however, inconsistent outcome reporting complicates comparisons across studies. We conducted a SR of total shoulder arthroplasty (TSA), hemiarthroplasty and reverse TSA studies to determine reported outcomes. After database searches, articles meeting inclusion criteria were coded for study type, study design, sample size, outcomes, measurement device, specific metric, aggregation method, outcome classification and side effects. We summarized results using frequencies and percentages for binary outcomes, and medians and interquartile ranges for continuous outcomes. Locally weighted scatterplot smoothing (nonparametric regression method) was used to smooth scatterplots of outcome domain use over time. Our SR identified numerous shoulder arthroplasty outcomes lacking standardized outcome measurement. Future work is needed to develop a consensus-based COS incorporating views of stakeholders.

## **02.03.14 Methodological Quality and Risk of Bias Assessments in Orthopedic Surgery Systematic Reviews**

**Sims, Matt** *Other*

**Detweiler, Byron** *Other*

**Vassar, Matt** *Other*

Determining clinical intervention effectiveness and appropriately guiding clinical decisions is dependent upon the validity of primary studies (PS) included in systematic reviews (SR). Authors reported utilization of various tools for analyzing methodological quality/risk of bias (MQ-RoB) within PS. A demand for higher quality orthopedic research, raises concerns regarding the ability to conduct high MQ/low RoB studies and evaluate non-randomized clinical trials (RCT). A PubMed search yielded 299 articles from the top 10 orthopedic journals per Google Scholar Metrics h5-index. SR meeting inclusion criteria were coded for whether MQ-RoB was assessed; MQ-RoB tool; authors' custom measures, if used; if MQ-RoB was graded; if low MQ/high RoB was found; if low MQ/high RoB was included; if subgroup, meta-regression or sensitivity analyses were performed to evaluate the effect of low MQ/high RoB studies; and how MQ-RoB was presented. Of 122 SR, only 63 utilized a MQ-RoB tool. Cochrane RoB Tool and Methodological Index for Non-Randomized Studies (MINORS) were the most utilized tools for analyzing MQ-RoB. Studies rarely reported subgroup, meta-regression or sensitivity analyses. Surgical interventions pose a dilemma due to the inability to randomize, blind and eliminate bias producing aspects. Downs and Black, MINORS, and ACROBAT-NRSI can be used to assess MQ/RoB in non-RCT. However, nearly half of SR and meta-analyses published in high impact journals failed to utilize a RoB tool.

### **02.03.15 A Meta-Analysis of Coefficient Alpha for the Dundee Ready Education Environment Measure (DREEM)**

**Sims,Matt** *Other*

**Sanchez,Zachary** *Other*

**Detweiler,Byron** *Other*

**Herrmann,David** *Other*

**Vassar,Matt** *Other*

Course satisfaction, perceived well-being and academic achievement are considered key determinants in assessing educational environments. The Dundee Ready Education Environment Measure (DREEM) is the most suitable instrument in measuring education environment in medical schools. DREEM's five subscales (Perception of Learning, Perception of Teachers, Perception of Atmosphere, Academic Self-Perceptions, Social Self-Perceptions) are used in more than 20 countries and translated into more than 8 languages. Despite the widespread use of the measure, little is known about the psychometric properties of its scale scores. We conducted a meta-analysis of reliability coefficients for the DREEM to summarize mean estimates of reliability across diverse samples and to determine moderator variables related to sample or scale characteristics that might influence variance of reliability estimates across studies. The database search yielded 432 articles, of which 354 were obtained. Following full-text review, data was extracted from 50 studies (14.1%). Mean alpha estimates were .90 for the composite scale, 0.78 for the POL scale, 0.73 for the POT scale, 0.69 for the ASP scale, 0.73 for the POA scale, and 0.52 for the SSP scale. Results indicate acceptable alphas for the composite scale; however, subscale alphas were moderate to low. Thus, measurement error may be problematic when using this scale.

### **02.03.16 The Comparison of the PUSH Band vs. TENDO in Power Output and Velocity in Moderately Active Adults**

**Price,Audrey** *University of Central Oklahoma*

This project will emphasize the need for power output in moderately active adults by utilizing the PUSH Band vs. the Tendo in order to improve their fitness level. Participants will be recruited from the University of Central Oklahoma meeting criteria needed. Testing of power and velocity will be done utilizing the PUSH Band and the Tendo Weight Lifting Analyzer. To determine the accuracy and validity of the PUSH band on bench press and other lifts in moderately active adults. The primary goal is to determine the accuracy and validity of the PUSH band on bench press and other lifts in moderately active adults. In addition, the purpose is to compare the accuracy of the bench press power output in the PUSH vs. the TENDO in moderately active adults. The hypothesis for the project is that the PUSH Band is an accurate way to measure velocity and power in resistance training in comparison to the Tendo Weightlifting Analyzer. If the PUSH Band has supported data to accurately measure these variables, it could allow more practical settings for training and studies to take place. The other goal of this project is to provide a new way to merge fitness and technology to improve the fitness level in moderately active adults. With the shift for technology based workout data, this could encourage the use of the PUSH Band to track power and velocity. The relevant results of this project indicate there is a correlation of validity with the PUSH Band and the Tendo have similar results.

## **02.03.17 Statistical Analysis of Anthropometric Data and Fitness Results From Children At The Edmond, Oklahoma YMCA Locations**

**Ghafil, Jalal** *University of Central Oklahoma*

**Holmes Ph. D., R.D., L.D., Tawni** *University of Central Oklahoma*

This study focused on running different statistical analyses on data obtained from children at the YMCA locations in Edmond, Oklahoma and determining how they compared to national averages. The hypothesis was that the data would yield results consistent with trends regarding Oklahoma being one of the most obese states in America. A variety of tests were run in SPSS including correlations, 1 Sample T Tests, 2 Sample T Tests, Independent T Tests, 1 Way Anova, and 2 Way Anova. The results show that many of the children had BMI scores which were above the national averages, and the children who were indeed above national averages were so far above that it was alarming. The complexity of the analyses yielded results which are very complex, but overall, the P values are very low across the 6 different analyses which were run. This demonstrates that further research is necessary on interventions for children that help with nutrition education programs in order to lose weight. Getting information to parents about how to help their child succeed in living a healthy lifestyle is also vital.

## **02.03.18 Analysis of Modern Blue-Blocking Lenses in Relation to 405 nm Light**

**Luongo, Anthony** *Northeastern State University*

**Cole, Kenenth** *Northeastern State University*

**Whittle, Charles** *Northeastern State University*

High-energy blue light has many potentially harmful effects on both ocular health and physiological functioning. There are now many products on the market designed decrease blue light exposure. This study was designed to evaluate the performance of various modern blue-blocking lens treatments. Seven blue-blocking lenses were tested using an optical bench, spectrometer, and a 405 nm laser light source. Five spectra were captured for each lens and a control. Peak intensity values were averaged to determine the corresponding means. Percent change values were then calculated, comparing each test mean to the control mean. All lenses tested showed a significant reduction in blue light transmission at 405 nm. The following percent reduction values were calculated: BluTech Outdoor (BluTech Lenses) 92.7%; BluTech Indoor (BluTech Lenses) 92.4%; BlueProtect (Zeiss) 41.8%; Retinal Bliss DES (Quantum Innovations) 33.5%; Recharge (Hoya) 31.3%; Crizal Previncia (Essilor) 22.0%; SeeCoat (Nikon) 19.1%. Statistical analysis showed adequate repeatability for all data collection methods. There was a wide range of reduction values between products. But some lenses were designed for varying levels of reduction at different parts of the blue light spectrum, while this study only tested one specific portion. There is also debate on how much blue light reduction is necessary. Therefore, a direct comparison between products should not be made using these methods.

## **02.03.19 Temporal alterations in expression of aspartate aminotransferase and glutaminase in rat DRG neurons during experimental colitis.**

**Scheckel,Caleb** *Oklahoma State University*

Glutamate (GLU) synthesis in neurons occurs by two enzymes, aspartate aminotransferase (AST) and glutaminase (GLS). Previous studies have examined alterations in AST and GLS expression in rat dorsal root ganglion (DRG) neurons during adjuvant-induced arthritis (AIA). With this model, we noted a biphasic temporal expression of AST and GLS. Our current study aimed to determine the temporal expression of AST and GLS in S1 DRG neurons during a visceral inflammation model, TNBS-colitis. DRG were processed for AST and GLS immunoreactivity followed by quantitative image analysis. A biphasic expression pattern was observed. Increases in AST and GLS occurred at days 1-2 (25-60%) of colitis, returned to baseline at day 4, but elevated at days 8, 16 (30-40%), and day 30 (5-15%). During colitis there is a common expression pattern for AST and GLS in DRG neurons, similar to neurons during AIA. A shared blueprint of neurogenic inflammation, multiple inflammatory mediators, and neurotrophic factors may be responsible for these expression patterns. Neurogenic and inflammatory mediators may cause the initial increase, whereas, a second elevation may be due to neurotrophic factors. Elevated AST and GLS levels in DRG neuronal perikarya leads to increased GLU production in peripheral and central terminals producing peripheral and central hypersensitivity. Therapies for diminishing altered GLU synthesis may hold promise for pain relief in visceral and somatic injury and inflammation.

## **02.03.20 A Social Network Analysis of Outcomes in Pediatric Acute Lymphoblastic Leukemia Clinical Trials**

**Blaik,Will** *Oklahoma State University*

**Wayant,C.** *Oklahoma State University*

**Herrmann,David** *Oklahoma State University*

**Nissen,Tim** *Oklahoma State University*

**Wiebe,Jordan** *Oklahoma State University*

**Wheeler,Denna** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

Objective: Social network analysis has recently been applied to outcome networks to gauge interconnectivity. This study will do the same with respect to pediatric acute lymphoblastic leukemia (ALL) to diagnose the state of outcome reporting in pediatric cancer trials. Methods: First, a search of clinical databases was conducted for cancer trials concerning pediatric ALL. From the results of this search, 295 papers were randomly sampled and were coded for outcomes, or excluded for complete lack thereof. A total of 182 papers were included in the analysis. A matrix was constructed to display interconnectivity of outcomes. Results: From our 478 unique outcomes we found a total of 18,134 total co-occurrences. Eighty-two outcomes co-occurred with five or less other outcomes. Overall survival (n=632) was most frequently reported. Conclusion: Our data suggests that certain aspects of patient care in pediatric ALL trials are well reported. However, many aspects of patient care, such as quality of life, suffer from lack of reporting in conjunction with other outcomes. A development of core outcomes in pediatric cancer trials is useful and beneficial to researchers and patients. Ensuring a consistent and well-rounded approach to research practices that provide quality patient care, core outcomes simultaneously allow for original innovation in science.



## **02.03.21 Common Core Outcomes in the Treatment of Hyperemesis Gravidarum as Reported in Obstetrics and Gynecology Journals**

**Sanchez,Zachary** *Oklahoma State University*

**Rankin,Justin** *Other*

**Naumann,Kelsey** *Other*

**Umberham,Blake** *Other*

**Holzman,Matthew** *Other*

**Vassar,Matt** *Other*

Core outcome sets (COS) are consensus-based, standardized sets recommended for measurement of a condition. Currently, the diversity of outcomes and the methods used to measure them present challenges for evidence synthesis. These consequences include the risk of selecting suboptimal outcomes due to inconsistencies in operational definitions across trials, approaches used for measurement, and an altogether omission of important outcomes. The use of COS mitigates inconsistencies leading to more consistent research, limited reporting bias, and strengthened clinical decision making. We conducted a systematic review examining Hyperemesis Gravidarum (HG) to determine reported outcomes across studies, determining the instruments used to measure these domains. We searched PubMed, the Cochrane Database, and clinicaltrials.gov for relevant studies examining HG. Initially articles were screened, followed by a full-text review, extracting reported outcomes in each study, including the domain, measurement instrument, associated metric, aggregation method, and time intervals. Descriptive statistics were tabulated for all outcomes. This was the first phase for development of a COS for HG. Future studies, must utilize consensus methodology (Delphi technique) to arrive at a COS important to researchers, patients, and stakeholders. This study elucidates the need for a standardized COS for HG. Standardization will result in improved outcome measurement.

## **02.03.22 Relationship Between Quality of Life and Physical Activity with Diagnosed Myocardial**

**wilson,meagan** *University of Central Oklahoma*

According to Mozaffarian and the Centers for Disease Control and Prevention, the 2014 statistics have shown that a myocardial infarction occurs in approximately 735,000 Americans every year, which is caused when the heart muscle is damaged or dies because of blocked coronary arteries. Research has suggested that positive physical health practices throughout life and emotional well-being are suggested to prevent or delay this cardiac event. The purpose of this research is to determine if health related quality of life is related to physical activity levels in older adults who have a history of myocardial infarction. Participants will be patients who have undergone a heart procedure, some being previously active and others being previously inactive. Physical activity level will be assessed with a FitBit, which will be worn for three days, and HRQoL data will be gathered with the SF-36 prior to assessing physical activity level. The FitBit will assess how much the participants move on an average daily basis, and it will be compared to how high each participant's HRQoL is. The HRQoL survey should take about ten minutes to complete, and participants will fill it out while at the study location.

## **02.03.23 A Social Network Analysis of Shoulder Arthroplasty Studies**

**Scott,Jared** *Oklahoma State University*

**Sims,Matt** *Oklahoma State University*

**Detten,Grant** *Oklahoma State University*

**Howard,Benjamin** *Oklahoma State University*

**Detweiller,Byron** *Oklahoma State University*

**Carr,Brandon** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

Introduction: Many techniques exist to generate core outcome sets. We utilized social network analysis to illuminate outcome co-occurrence behaviors in shoulder arthroplasty systematic reviews and primary studies. Method: We first searched PubMed, SPORTDiscus and the Cochrane Central Register of Controlled Trials. We then narrowed the results to publications since 2005. Our search identified 2932 studies from this time period. Our final sample size of eligible studies was 144 articles. Two co-occurrence matrices were coded using data extracted from the included studies according to the guidelines outlined in our abstraction manual. We imported the co-occurrence matrices into UCINET and used NetDraw to generate the networks. Result: The outcome with the highest co-occurrences was pain in primary studies with 356 co-occurrences and constant score in systematic reviews with 183 co-occurrences. The outcomes most commonly reported together in primary studies and systematic reviews were flexion and external rotation, which occurred together in 36 and 18 studies respectively. Conclusion: While some of the studies in this analysis generally reported outcomes that co-occurred in other studies of similar objectives, a substantial amount of studies additionally reported outcomes with very few co-occurrences with studies of similar objectives. Social network analysis techniques are a novel application to identify outcomes with many co-occurrences across studies of similar objectives.

## **02.03.24 Epidemiology of Testicular Cancer in Oklahoma**

**Pate,Anne** *Southwestern Oklahoma State University*

**Biggs,Dylan** *Southwestern Oklahoma State University*

**Hill,Ben** *Southwestern Oklahoma State University*

**Henricks,Colton** *Southwestern Oklahoma State University*

The objective of this project was to use previously collected public health surveillance data from the Oklahoma Central Cancer Registry to describe the distribution of testicular cancer by age, race, stage and insurance status at diagnosis among residents of Oklahoma. The results of this study can be used to increase awareness and promote screening. This study analyzed 1,298 cases of testicular cancer diagnosed between 1998 and 2012 among Oklahoman males. Age specific incidence rates were calculated to assess trends over time and across age groups. Odds ratios were calculated to assess insurance status, stage at diagnosis, and incidence by race among residents of urban versus rural counties. Results of the analysis found that incidence peaked among males between the ages of 30 and 34. It was also determined that the odds of men who have Medicaid at diagnosis being diagnosed at a late stage is 52% (statistically significant) higher than among men who have private insurance. It was also determined that there was no significant difference in insurance status based on residence in a urban, metro, or rural county. Furthermore, there was no significant difference in staging based on county of residence, suggesting there are no major disparities occurring between urban and rural residents.

## **02.03.25 Commonly Reported Outcomes in Pediatric Anesthesia Trial Registries**

**Demand,Alex** *Oklahoma State University*

It is important for researchers and clinicians to compare studies in pediatric anesthesia to determine the best course of treatment for patients. An ideal way to compare studies these studies is to have consistency in reported outcomes. Looking at trial registries reported on clinicaltrials.gov we found a wide array of reported outcomes that aim to determine the effectiveness of different anesthetics in pediatric patients. Trials were screened by all investigators in our group, then coded using a coding template to quantify the data in the trials. Results were analyzed and shown to have a lack of common outcomes, making it harder for studies to be compared in order to give the best care to patients. The results show the most commonly reported outcomes in hopes to give researchers of pediatric anesthesia interventions a better idea of what outcomes are important to the community of pediatric anesthesia investigators. A development of a core set of outcomes is needed in order to better compare and contrast the interventions used in pediatric anesthesia trials.

## **02.03.26 The Effect of Prism on Preferred Retinal Locus**

**Blanco,Daniel** *Northeastern State University*

**Ratzlaff,Chase** *Northeastern State University*

**Zodrow,Ashley** *Northeastern State University*

**Purpose.** Our study evaluated the effect of base-up prism on the preferred retinal locus (PRL) of patients with central vision loss as determined by scanning laser microperimetry. **Methods.** We assessed the PRL in 13 subjects with central scotoma under four conditions: No lens, plano, 6 $\Delta$  base-up, and 10 $\Delta$  base-up. The PRL was evaluated using the MAIA scanning laser microperimeter with no lens, and then with each of the three lenses. The PRL was determined in degrees in horizontal and vertical coordinates from the center of the optic disk using graphical analysis. **Results.** The plano lens induced a PRL mean shift of 0.93 degrees superiorly and 1.65 degrees nasally, compared to no lens. The PRLs with the two powers of prism were compared to the plano lens and showed a superior shift of the PRL in 22 of 26 cases (84.6%). The mean movement was greater with the 10- prism (1.73 degrees) than with the 6- prism (1.37 degrees). The amount of movement was significantly different from zero ( $p = 0.001$  for 6D and  $p = 0.004$  for 10D). However the shift was also significantly different from the prism power of 3.43 degrees for the 6 $\Delta$  lens and 5.71 degrees for the 10 $\Delta$  lens ( $p < 0.001$  for both). **Conclusion.** In our study base-up prism shifts the PRL in the direction of the prism base, but not nearly as much as the prism deviates light. More study is indicated to evaluate whether this small shift is clinically or functionally significant.

## **02.03.27 Health Insurance Literacy: Needs Assessment of Northeastern State University Students**

**Foutch,Shae** *Northeastern State University*

**Aula,Mercy** *Northeastern State University*

**Tozzio,Mark** *Northeastern State University*

Lack of health insurance literacy is a problem that prevails among different segments of the U.S. population. Its implication range from affording health care, to accessing its benefits. This research is aimed at assessing the health insurance literacy of undergraduate students enrolled in Northeastern State University, and at analyzing the relationship between health insurance literacy, student demographics, and health insurance coverage. The data used in the study were generated, after administering an online survey to all the undergraduate students enrolled at the university, and had declared a major. A total of 231 respondents completed the survey while the findings were analyzed using an Independent T-test and ANOVA. Health Insurance Literacy Measure (HILM) developed by the American Institute for Research (AIR) was used to assess the health insurance literacy of the students. Results of the research showed a statistically significant difference between health insurance literacy and student age groups, type of coverage, and the use of preventive care services. Discussion of the research is centered on health insurance literacy of specific demographic and health insurance coverage groups, and the impact on primary and preventive care services utilization, and emergency department use. Future directions and remedies are also discussed.

## **02.03.28 Epidemiology of Colorectal Cancer in Oklahoma**

**Odam,Seth** *Southwestern Oklahoma State University*

**Pate,Anne** *Southwestern Oklahoma State University*

**Freels,Tara** *Southwestern Oklahoma State University*

The objective of this project was to use previously collected public health surveillance data from the Oklahoma Central Cancer Registry to describe the distribution of colorectal cancer by age, race and stage at diagnosis among residents of Oklahoma. The results of this study can be used to increase awareness and promote screening for this preventable cancer. This study analyzed 29,781 cases of colorectal cancer diagnosed between 1997 and 2012 among Oklahomans. Age adjusted and age specific incidence rates were calculated to assess trends over time and across age groups. Odds ratios were calculated to assess insurance status and age at diagnosis by urban/rural county of residence. Results of the analysis found that incidence decreased significantly among females between 1998 and 2012. Incidence increased with age among both males and females. A metro/urban resident is 56% more likely to have insurance than a resident of a rural county, OR=1.56. A metro/urban resident is 20% more likely to be diagnosed before the age of 65 compared to a resident of a rural county, OR=1.2. In conclusion, the results of this analysis confirmed similar trends in Oklahoma as compared to the United States. Furthermore, screening is encouraged among all populations.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **02. Education and Professional Studies**

#### **04. Nursing**

##### **02.04.01 Alternating Pressure Mattress Vs. Overlays**

**Calhoun,Michael** *Other*

**Al-ag,Charisse** *Other*

**Collins,Leslie** *Other*

**Mahieu,Jennifer** *Other*

Pressure sores or ulcers are damages to the skin and underlying tissues from pressure on the skin for a long period of time. If not prevented, it can result in more injury leading to infection and then maybe even death. Our research proposes that proper interventions like repositioning and the use of appropriate mattresses and overlays can decrease the risk of the development of a pressure sore. Alternating pressure mattresses are specialized mattresses that automatically change the position of the client depending on the set amount of time. Overlays are simply air mattresses with nodules that relieve pressure on bony prominences, but the client needs to be turned mechanically by the health care staff. Overlays are for clients not anticipating to be, in this case, ventilated for longer than 14 days suggests it is a better choice. However, studies show that if the client is to be ventilated for a longer period of time, an alternating pressure mattress is highly recommended.

## **02.04.02 Water Immersion During Labor**

**Schanbacher, Carrie** *Northwestern State University*

**fly, kelsey** *Northwestern State University*

**Mahieu, Jennifer** *Northwestern State University*

**Collins, Leslie** *Northwestern State University*

Water Immersion can be a healthy alternative to pharmacological measures to relieve pain in the first stages of labor. The first stage of labor include three phases; latent, active, and transitional. These three phases can last anywhere from 6 to 12 hours in length. Water Immersion during these phases has been shown to significantly reduce the length of time a woman in labor spends in the first stage. By reducing this time, a woman has a greater chance of avoiding exhaustion and reducing the risk of pain during the second and third stages. Furthermore, any route of reducing the use of pharmacological measures is favored. Other benefits for the women include; decreased chance of tearing during the birthing process, warm water and positioning promotes dilation and relaxation, all which have a direct effect on the baby's status. Water Immersion is an effective complimentary therapy in the birthing process.

## **02.04.03 Chlorhexidine**

**Looper, Anna** *Northwestern State University*

**Westerman, Deanna** *Northwestern State University*

**Medina, Carol** *Northwestern State University*

Central line associated blood stream infections (CLABSI) are an issue in many hospitals today. A blood stream infection that is present 48 hours after the placement of a central line is defined as a central line blood stream infection. These types of infections can include methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococcus (VRE), gram-positive bacteria, and surgical site infections (SSI's). If not controlled or prevented, patients with a central line associated blood stream infection will not have a good prognosis. Our research suggests that if you implement the use of 2% or 4% Chlorhexidine Gluconate before and after insertion of a central line, you can reduce the incidence of infection. In addition to the reduction of CLASBI's, studies have shown that implementation of a Chlorhexidine Gluconate protocol can be more cost effective then alcohol, betadine, or if they were to develop an Central line associated blood stream infection.

#### **02.04.04 Preterm Infants and the Use of Pacifiers**

**Oke,Ayodele** *Other*

**Onyedili,Humphrey** *Other*

**Collins,Leslie** *Northwestern State University*

**Mahieu,Jennifer** *Northwestern State University*

Nutrition is one of the priorities nurses are concerned about when it comes to preterm infants. It improves survival and promotes growth and development. The denial of that early introduces malnutrition which can have both short-and long-term benefits for the infant. It is important that preterm infants start oral feeding as soon as possible to survive and get healthy quickly. Studies have shown that by using external stimuli, premature babies can move to oral feeding at an earlier period than 34th gestational week, have increased daily weight gain and be able to have an early discharged from hospital earlier design. In this study, 90 premature infants were studied with 30 premature infants who were grouped with the pacifier, lullaby groups. This research aimed to determine the effect of giving pacifiers to premature infants and making them listen to lullabies on the transition period to oral feeding, sucking success and their vital signs. These results demonstrate that giving pacifiers to premature infants and making them listen to lullabies (which is one of the non-pacifier methods) has a positive effect on their transition period to oral feeding, their sucking success and vital signs.

#### **02.04.05 Poor Oral Health and Pregnancy Complications**

**Bailey,Rachel** *Northwestern State University*

**Ford,Julia** *Northwestern State University*

**Collins,Leslie** *Northwestern State University*

**Mahieu,Jennifer** *Northwestern State University*

Preterm and low birth-weight babies are a major health concern. These babies have a greater risk of death in the first month of life as well as feeding difficulties, thermal instability, respiratory distress syndrome, jaundice and delayed brain development. Periodontal infections affect the systemic health and inflammatory response of pregnant women possibly placing a similar burden on the placenta. Since the increased risk for pregnancy complications has long been associated with maternal infections, it is important to address this issue. Research also suggests that mothers that receive dental treatments for periodontal infections, gingivitis, and restorative procedures during the second trimester of gestation have no increased risk for adverse pregnancy outcomes. Our research indicates a relationship between the poor dental health of the mother and the increased incidence of adverse pregnancy outcomes, specifically preterm and low birth-weight newborns.

## **Abstracts from the 2016 Oklahoma Research Day**

**Held at Northeastern State University**

### **02. Education and Professional Studies**

### **05. Physical Education**

#### **02.05.01 Effects of an ACL Prevention Program on Neuromuscular Balance on Female College Soccer Players**

**Ozturk,Ahmet** *Northeastern State University*

Purpose of this study is to bring public awareness to the amount of ACL injuries among female athletics seeking ways to reduce ACL injuries from occurring. The Anterior Cruciate Ligament, more commonly referred to as the ACL, is located behind the patella and connects the femur to the tibia. Stabilizing the knee joint is the primary function of the ACL. Possible causative factors for the increase in ACL injuries among the female soccer players may be extrinsic body movement, muscular strength, shoe-surface interface, and skill level. Methods: The Balance Error Scoring System Test (BESS) was used to measure neuromuscular balance of 17 female soccer players before and after a six week ACL injury prevention program which consisted of a warm up, specific lower body stretches, directional running, plyometric, core and hamstring strengthening exercises. An analysis of covariance was used to determine the differences between the pre and post results of the Balance Error Scoring System Test. Results: The mean pre-test BESS score was 13.06 (standard deviation of 4.7). The post-test mean score was 11.59 (standard deviation of 4.1). There were no statistical differences between the pre and post test results. Conclusion: Possibly partly due to the length of this study (six weeks), subjects physical conditioning was not improved enough to produce better post-test scores. Key Words: Neuromuscular Coordination, Plyometric, Anterior Cruciate, Ligament, Agility, Balance.



## **02.05.02 The Effects of an Eight Week Exercise Program on Faculty and Staff Anxiety**

**Hunt, Andra** *Cameron University*

**Subedi, Utsab** *Cameron University*

**Morrison, Jennifer** *Cameron University*

Previous research shows there may be a correlation between the rise in anxiety and the decrease in exercise over the years, and it has been shown that those who exercise regularly are less likely to develop mental disorders. Due to previous research, it has been proposed that exercise is an effective treatment for those with anxiety. The purpose of the present study was to examine if the anxiety level of staff and faculty at a university varied before and after an eight week fitness challenge. A total of 21 faculty and staff members were recruited and participated in a pre and post body composition analysis using the TANITA BF-350 and Hamilton Anxiety Scale. Findings concluded that there was a decrease in anxiety levels after completing the eight week exercise program.

## **Abstracts from the 2016 Oklahoma Research Day**

**Held at Northeastern State University**

### **02. Education and Professional Studies**

### **06. Professional Teacher Education**

#### **02.06.01 LGBTQ and You: Developing Retention Strategies for Students in the LGBTQ+ Community**

**Robinson,Cody** *Northeastern State University*

**Thurman,Hailey** *Northeastern State University*

One vital role of the higher education administrator is to retain students at their home institutions. In order to enrich students' experiences in college, administrators must constantly adapt and refine vital knowledge and skills in retention strategies to improve the quality of their students' lives. However, it is clear and reinforced by contemporary research that LGBTQ students struggle to stay in higher education. This ongoing research in retention for LGBTQ students help frame, model and assess the skills and programs needed to retain students of this underserved population.

#### **02.06.02 Standing Room Only: The Crematory Debate**

**Spomer,Jaclyn** *University of Central Oklahoma*

**Fritch,Dr John** *University of Central Oklahoma*

This study explored the controversy over a proposal to construct a crematorium in Bethany, Oklahoma. Bethany is a small suburb in central Oklahoma located northwest of Oklahoma City. Mercer-Adams Funeral Service, a well-respected and established business in the community, submitted a proposal to the city council that centered on rezoning property that was already owned by the funeral home. Once approved, it was the intent of Mercer-Adams Funeral Home to construct an additional facility that included a crematory. A group of citizens, who opposed the construction of a crematory, had surfaced by the end of 2014. By June of 2015, the group had successfully mobilized resources and fiercely resisted the proposal. The antagonism launched by the community group eventually led Mercer Adams to withdraw their proposal. This research documents the growing controversy between competing interests within the theoretical framework of collective behavior. Data was drawn from the city's website, media accounts, and in-depth interviews. A timeline was developed to understand the manner in which the protesting group mobilized resources that would eventually frame the issue in the media as, among other things, a "health hazard."

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **03. Fine Arts and Design**

##### **01. Art**

###### **03.01.01 Contemporary Art on a Socialist Canvas: The Repurposing of Urban Space through Street Art in Lodz, Poland**

**Johnson,Haley** *University of Central Oklahoma*

The residents of Lodz, Poland, had once taken pride in the city's large textile factories and industrial culture emerging in the late nineteenth century and continuing during socialist Poland, although wiring different political systems. After the fall of socialist Poland in 1989, many factories had fallen into disuse and the nineteenth century apartment buildings had been deteriorating due to the lack of findings. In the process of rebranding the image of the city, in the first decade of the twenty first century, old factories and other buildings were appropriated as a means of showcasing the new concept of Lodz, as an international Western tourist city. Through different forms of public and private funding, the Urban Forms Gallery established in 2009 created over twenty murals on the outer walls of deteriorating buildings in the city center as a way to showcase Lodz to the city's visitors. This paper examines the murals within the framework of the city branding. The paper argues that the repurposing of buildings in Lodz, Poland created a thriving artistic space that not only captures the history of the city, but also its contemporary social problems of high unemployment and urban depopulation.

###### **03.01.02 Cubano Polaco Americano: A Study on the Globalization of Socialist Cinematic Poster Art during the Cold War**

**Musgrove,Olivia** *University of Central Oklahoma*

This study contributes to limited scholarly research on artistic exchange between socialist countries and the United States during the Cold War period, by examining socialist Cuban filmic poster art produced between the 1970s and the 2000s. These posters act as an example of the globalization of socialist art, usually understood within the framework of the Communist bloc. They are an interesting case to study, as Cuba is the only Latin American country with a government based on Marxist-Leninist principles. The material and stylistic choices for the posters were limited to Cuba's contact with socialist countries in Europe due to the U.S. imposed trade embargo on Cuba. By examining Cuban cinematic poster art made for American films and comparing them with Polish cinematic poster art, I argue that the globalization of art not only imbues similarity, but also creates art unique to each society. First, I examine the Cold War era socioeconomic, political, and cultural situation in Cuba, with a particular emphasis on Cuba's relationship with the US and the USSR, and the establishment of the state-sponsored aesthetic tradition in Cuba. I then conduct a semiotic examination of Cuban and Polish posters for the same American films, including Hitchcock's *Frenzy*, Fosse's *Cabaret*, C. Scott's *Rage*, and Coppola's *The Godfather*, to show how the posters of each society utilized culturally specific aesthetic language while retaining the same message of the f

### **03.01.03 Curiosity on the High Seas: The Curiosity Cabinet and the East India Marine Society**

**Ross, Lauren** *University of Central Oklahoma*

The East India Marine Society was founded in Salem, Massachusetts in the year 1799. It was outlined in their statement of purpose that the society should 'form a Museum of natural and artificial curiosities.' This paper will discuss the Native American artworks which were donated to the East India Marine Society between the years of 1800 and 1850, and establish that the members of the East India Marine Society were active agents in contributing to the concept of the "Vanishing Race" within early to mid-19th century America. First, this paper will introduce the East India Marine Society and the tenets of their society. Second, the paper will approach the collection of the society as a curiosity cabinet, which reinforced and reproduced Anglo-Saxon ethnocentric views in 19th century America. By placing the Native tribes into this label of curiosity, the concept of the other flourished and the Native American became an idea that could be sold to popular culture. Third, the paper will address how the collection served to control and frame the Natives as a "vanishing race" through removing the artwork from the framework of Native American collective knowledge of symbolic meaning and interjecting the collector's interpretations. Therefore, by analyzing the provenance and the means of acquisition of these artworks, the study will discuss the curiosity cabinet as a visual rhetoric, which celebrated the collectors' place in justifying Western expansion.

### **03.01.04 Beauty is in the Eye of the Media: Comparing Classical Ideals**

**Summers, Blair** *University of Central Oklahoma*

Whether it is an appetite for voluptuous curves, cartoon-like eyes or beards of wisdom, all cultures construct the concept of ideal beauty, which in turn shapes human behavior. Ancient Greece is infamous for its innovative vision of ideal beauty achieved through symmetry and exaggeration of the male human body during the Classical Period. Comparatively, today's media in the United States incessantly promotes photoshopped images of male bodies, such as Ryan Gosling and Zac Efron, to simultaneously advocate athletic musculature and a thin physique. This paper compares the ideology beyond the concept of male beauty in Classical Greece and contemporary U.S. to argue that in both societies, the constructed male beauty standard generated societal pressures to achieve the culturally-defined form of perfection. The paper utilizes historical, art historical, and social research on the concept of beauty in each society. First, this paper will discuss today's idealized body imagery portrayed by media and visual culture in the United States. Second, the cultural context and techniques used by artists in Classical Greece to define perfection will be discussed. Finally, the paper will consider the ways in which men sought to achieve the culturally-imposed ideal body in each society. While Classical Greece and contemporary U.S. represent unique social, political and religious lifestyles, their concepts of male beauty produced similar behaviors to attain the preferred standard.

### **03.01.05 Racism and the Stereotype of Mexican-Americans in the United States**

**Higuchi,Elsa** *University of Central Oklahoma*

This research examines the depiction of Mexicans in visual culture in the United States at four historical moments: the Mexican-American war, during the Great Depression of the 1930s, the Bracero Program of the 1940s, and in the contemporary period. At each historical moment, the study discusses political and economic events that caused the stereotyping of Mexicans in public media. The major argument is that the stereotyping of Mexicans reflects the political relationship between the United States and Mexico. Whether Mexicans are forced out of the United States or are needed to work under exploited conditions, they are always stereotyped as the immigrant Other in American culture. By deconstructing the negative stereotypes, this study contributes knowledge about Mexican culture in the United States too often omitted from the history textbooks used in public schools.

### **03.01.06 Kabuki and Dumb Type**

**Adams,Joanne** *University of Central Oklahoma*

The artist collective known as Dumb Type was created in Japan in 1984. Its members comprise people from many creative disciplines. This paper compares and contrasts Dumb Type's OR and S/N performances with the more traditional Kabuki performances like Sugawara Denju Tenarai Kagami and Benten Kozo. The comparison is focused on the symbolism of the body in life and death. This paper argues that although Dumb Type prides itself as being a global performance group, it continues to represent traditional Japanese ideas of the body found in Kabuki shows. Dumb Type functions within Japanese traditional feelings about life and death. Thus, Dumb Type may be seen as important locally and globally. First, the characteristics of both Dumb Type and Kabuki performances referenced above are described. Second, the theme of life of the body in these performance styles, and how that relates to both traditional and modern Japan is discussed. Third, death of the body is explored using theatrical devices and how those relate to the Japanese perception of death. Both life and death themes regarding the body are expressed through the movements of the performers and the speed of the music and actions. My understandings on how death is perceived in Japan on the writings of the anthropologist Susan Long, who researches the opinion of the dying and deceased in different countries. Finally, I compiled articles relevant to Japanese performance art and the prominence of Kabuki in relation to the bod

### **03.01.07 More Than One Kind of Family: Representations of Same-Sex Couples, and Their Families, in Modern Commercial Advertising**

**Barlow, Mattie** *University of Central Oklahoma*

No one can escape the reach of commercial advertising. Cable subscribers and YouTube fanatics both must succumb to ads before indulging in the newest prime time show or latest viral sensation. Commercials for home loans, aspirin and even crackers share something common – they use family as a way to relate their product to the viewer. Until now, the “American dream”, in relationship to the family, has been visualized as a mother, a father and a child so consumerism in the media has reflected society’s “traditional” concept of family. This paper argues that a vast number of our modern society acquires their ideas of social norms through mass media and to exclude a specific group of people dehumanizes them. More specifically, some modern marketing campaigns reflect a more inclusive idea of the American family, representing homosexual couples and their families as consumers, while utilizing the same emotional branding approach and family values of the past. First, this paper will discuss how commercial advertising appeals to the nation’s collective cultural identity by depicting social forms of identities to sell products. Second, this paper will examine the recent Tylenol marketing campaign, #HowWeFamily, Wells Fargo’s #WhyIWork and Honey Maid’s #ThisIsWholesome—to exhibit how they respond to the modern diverse family, including homosexual and heterosexual family units, and thereby reinforce the new concept of family in

### **03.01.08 DOMÉNIKOS THEOTOKÓPOULOS: LOST WORKS OF EL GRECO**

**Shiraiwa, Shikoh** *University of Central Oklahoma*

University of Central Oklahoma, College of Fine Arts and Design houses two paintings from the Studio of El Greco, St Thomas and St. Paul, as part of the Melton Legacy Collection. Those paintings were supposedly executed during the final period of El Greco’s life (about 1600 to 1614). The paintings done by El Greco during those years can be examined as the collaboration with his son Jorge Manuel and other assistants. Provenance of St Thomas and St. Paul was stopped since the last owner, John Levy Gallery in New York City in 1930s. The authenticity of many of El Greco’s artworks caused several disagreements among art historians and other scholars. St. Thomas and St. Paul are not exempt from this debate as Jose Gudiol and Harold E. Wetthey argued for the authenticity of the two paintings. First, this research project is to explore the significance of El Greco in Spanish art national identity and in the modern Western art identity through the painter’s multicultural background, and also to explore his works that reflected the sociocultural phenomena of Spain at the time. Second, I will introduce both the arguments for and against St. Thomas and St. Paul of the Melton Legacy Collection being painted by El Greco himself or by his assistant/s. In my conclusion, I will reintroduce the lost works of the Studio of El Greco, St. Thomas and St. Paul to complete the history of ownership following the 1930s. I will also argue my conclusion of the authenticity of the two pa

### **03.01.09 CAMEROON GRASSLANDS ART: DEVELOPMENT OF ART EDUCATION LESSON PLAN**

**Shiraiwa,Shikoh** *University of Central Oklahoma*

The University of Central Oklahoma (UCO) houses a significant collection of African Art from various cultures and societies, including Cameroon Grasslands Art. This research project is divided into three sections, Tsesah mask, the authenticity of UCO Tsesah mask, and art lesson plan development. First, I research a Tsesah mask from the Batcham society in the framework of social, cultural, religious, and political institutions at the time of its creation. A Tsesah mask is rare and recognized as one of the most distinct masterpieces of African art. Second, I focus on the UCO's Tsesah mask by examining the authenticity, provenance and publication. Third, with my research on the Tsesah mask, I developed a university level art education lesson plan for the Cameroon Grasslands Art including Kwifo, Kuosi, and Batcham cultures. This lesson plan followed the UCO's transformative learning values by including research (diversity, knowledge and understanding), art making (creativity and psychomotor skills), and presentation (leadership and application). The lesson plan was created for students to familiarize themselves with the UCO African Art Collection by exploring the sophisticated nature of Kwifo, Kuosi, and Batcham cultures and their art-making practice, which art objects reproduce the social power and privilege. This lesson plan was taught during the summer session in 2015, and its outcome is being evaluated through students' final art products and presentations.

### **03.01.10 Socialist and Catholic National Narratives and the Exclusion of the Other**

**Musgrove,Olivia** *University of Central Oklahoma*

**Pac,Teresa** *University of Central Oklahoma*

**Barlow,Mattie** *University of Central Oklahoma*

This research is concerned with a semiotic reading of the major saints in contemporary Poland. Because an artwork function within larger cultural systems, this study incorporates saint vitae and records of popular devotional practices of the period in order to demonstrate that each image is a sophisticated structure of overlapping meanings. As fictional characters, saints participate in a variety of discourses as they promote Polish Catholic national narrative to force Poland into the Western sphere of influences; advocate Catholic behavior and gender ideals; and obscure the history of non-Catholic religious groups in medieval and contemporary Poland. This exclusively Catholic linear narrative denies historical dynamic, diminishes the historical link between Poland and Russia, and reinforces the existing negative image of Russia and its Orthodox Church among Poles. The study goes beyond traditional iconographic approach to religious art and the universal function of saints and focuses on saints as part of Polish cultural and political capitals that favor the Polish alliance with the West.

### **03.01.11 ISIS vs Santa Muerte: Analyzing the Commonalities Between Two Cultures Justifying Violence Via Religion**

**Click,Carolyn** *University of Central Oklahoma*

At first glance, present-day Mexico appears to have little in common with ISIS (Islamic State of Iraq and Syria). The former is officially Catholic, and the latter is formally Islamic. However, in each society, religion is used to justify crime under different historical circumstances. In Mexico, the cult of Santa Muerte provides an identity for the crime-ridden underworld of a society which experiences failing economy and the desperation of a people yearning for basic necessities. Criminals partake in drug trafficking, human sacrifices, and homicide under the blessing of Santa Muerte. Similarly, ISIS is a social construction that uses religion, in this case Islam, to justify violent deeds such as beheadings, crucifixions, and other forms of homicide, but within the framework of the nation state. This paper will argue that in each case religion generates similar tactics of violence. First, the paper provides a brief analysis of the rise of each movement due to economic and political crises in each society. Second, the paper will stress how both Santa Muerte and ISIS followers utilize culturally specific visual language to construct their identities through ceremonies, practices, iconography, and space. Third, the paper provides a semiotic analysis of images associated with the violence of each movement to demonstrate that they reflect internal and external societal problems. In each case, strict focus on religion beclouds the historical dynamics of a society in crisis.

### **03.01.12 Hungarian Nationalism and Youth Movements in the 20th Century**

**Click,Carolyn** *University of Central Oklahoma*

The majority of societies endorse their own national values through various youth organizations. Countries such as The United States, Germany, Poland, or China support such youth movements. One of the most powerful examples of these youth organizations existed in 20th century Hungary. This paper examines the visual culture associated with three Hungarian youth organizations within the visual expression of their changing concept of nationalism in the 20th century. These groups include the Hungarian Scouts of 1912, the Young Pioneers of 1948, and the Freedom Fighters of the revolution of 1956. This paper argues that all three organizations mirror Hungary's changing notion of nationalism depending on what power held sway over the politics during their time of operation. Organizations such as the Scouts in Hungary were expected to be educated both culturally and politically. In the case of the Young Pioneers, the children were to reflect the ideals of the communist regime. The Freedom Fighters embodied a vie for liberation and acted as a protest against the occupying Russian forces. Nevertheless, the movements share similar visual language within their propaganda posters, magazine illustrations, postcards, photographs, ceremonies, badges, architecture, statues, uniforms, and other iconography. Each group constructs its identity through visual language parallel to the group's particular doctrine while reflecting the values of the dominating political regime of their ti



### **03.01.13 The Ideology of the West in the Writings on the Berlin Wall**

**Dill, Jeanie** *University of Central Oklahoma*

Writing on the wall was a solution for reaching out to the masses using propaganda, which became an art form used to portray the political constructs of society, influencing society by its own agenda. When analyzing the graffiti on the Wall there are multiple connotations to consider. Historically, the Wall is a symbol of suppression that if discussed as a barrier to seclude East Germans from capitalism-which also resulted in many deaths-then all negative connotations are bound to hold true. However, the Wall was also Chairman Ulbricht's attempt to secure the future of a socialist Germany, which granted East Germans job security in a functional society. Despite this, the Berlin Wall became the embodiment of Western ideals through graffiti, expressing a belief that could not accurately describe the state of the GDR. By studying the art, this research demonstrates the meaning of the Wall from the perspective of the German people. First, by conceiving the wall as a means to separate the East and West. Secondly, by establishing the political, social, and cultural significance of the Wall. The graffiti on the Wall conveys the West Germans' superiority to socialist Germany, thereby demonstrating how West Germans internalized the ideology of the West. Thus the graffiti idealized capitalism by degrading socialist society as if one was clearly dominant to the other.

### **03.01.14 Student Transformative Learning Record (STLR) Melton Gallery Internship, Fall 2015-Spring 2016**

**Barlow, Mattie** *University of Central Oklahoma*

**Shiraiwa, Shikoh** *University of Central Oklahoma*

The Melton Gallery Internship offers inter-disciplinary transformative learning opportunities to Museum Studies and Global Art and Visual Culture students through hands-on learning experiences. The work of this internship includes; 1) a research paper project on one of the artworks from the Melton Legacy Collection, 2) presenting research at Transformative Learning Conference, Oklahoma Research Day and submitting the paper to the Oklahoma Conference of Art Historians, 3) publishing opportunities including the art collections' catalog project, 4) assisting with daily gallery operations and collection management including, but not limited to, assisting art exhibition preparation and hosting opening receptions.

### **03.01.15 Sexuality: Photography and Sculpture Expressing Sexual Identities in the Art World**

**Braggs, Aundria** *University of Central Oklahoma*

Many Contemporary artist address the issue of sexuality, whether in performance art, photography, or other media. Some artist such as Robert Mapplethorpe, and Louise Bourgeois comment on sexuality in a way that could be viewed as pornographic or inappropriate. To what extent is sexually explicit imagery acceptable in contemporary art? How does each artist depict the "self" through their art? These are questions I will be exploring in these writings. I will not provide answers but information for the viewer to form an opinion for themselves. First, I will discuss the concept of sexuality in the United States, as a social construct, and what factors, such as religion, contribute to that concept. Second, I will discuss the controversy surrounding homosexuality and Sadomasochism. Third, I will talk about various artist who deal with these topics through their work. Keywords: Sexuality, Art, Robert Mapplethorpe, Louise Bourgeois, Homosexuality, Sadomasochism, Religion, United States

### **03.01.16 Yo Soy Chicana: Where Traditional Mexican Gender Roles & Feminism Intersect**

**Spence,Jenna** *University of Central Oklahoma*

The Chicano Movement arose in the 1960s among the highly energized climate of social change in the United States. It was predominately associated with the Mexican-American community and first generation immigrants. This paper will the discuss the Chicano Movement and the Chicana Feminist Movement that was born from it. After introducing the concept of Chicana Feminism this paper will introduce and define the traditional gender roles within Mexican-American culture and the ways in which Las Chicanas fought to redefine themselves based on these roles and other social stereotypes. In conclusion, this paper will look at the Chicana Feminist artist, Ester Hernandez, and her piece Sun Mad as it pertains the plight and struggle of women within the Mexican-American community

### **03.01.17 Art School Revolutions: The Barbizon School And A Comparison Of Unofficial Art Groups**

**Spence,Jenna** *University of Central Oklahoma*

This paper will present the Barbizon School of French landscape painting in comparison to the conservative French Academy painting of the early nineteenth-century; serving as a model for what can occur when the education of artist within an institution is heavily regulated. This paper will also discuss the Socialist Realism art of the Soviet Union and the counter-reaction of unofficial art groups that occurred in response to the oppressive and controlling governmental standards. Finally this paper will compare the concepts of artistic control that was present during both of these periods of art history; and, how, although different in degree, are vastly similar in the effects that they had on practicing artist that longed for creative freedom outside of academic and governmental standards.

### **03.01.18 Dinner Parties With The Dead: Aegean Bronze Age Tombs & Burial Practices**

**Spence,Jenna** *University of Central Oklahoma*

The way that societies chose to bury their dead not only tell us about the deceased themselves but also about those that buried them. During the Aegean Bronze Age mortuary practices such as tombs, their construction and the burial practices and rituals that surrounded them were highly unified. This paper will briefly examine the mortuary practices as they pertain to Aegean tomb, their construction and the methodology behind them, specifically in Mycenaean. After a proper understanding of Aegean tombs has been illustrated, mortuary practices such as the process of active burial, remains found during excavation and the rituals that surrounded this process will be discussed. Through careful dissection of mortuary practices during the Aegean Bronze Age a dichotomy between the world of the living and the world of the dead become increasingly evident. This separation of the world of now and that of the afterlife became a crucial element of mortuary practices and a defining characteristic of Aegean culture.

### 03.01.19 Middle Eastern Photography and Orientalism

**Jones, Jacob** *University of Central Oklahoma*

The Middle East, and especially its Islamic side, is the most photographed region in the contemporary world. In these photographs, often seen in media, the Middle East is depicted as tradition, exotic, or violent. Thus, these photographs allow the West to control the image of the Middle East as the backward "Other," against which the West defines itself as modern. As international artists struggle to conform to the contemporary Western art ideals, which one must if they desire a career as an internationally known artist, the Middle Eastern artists must sacrifice the complexity of contemporary cultural and artistic values of their societies to appeal to the Western gaze. Rather than reflect on the immensely diverse history of their own societies, photographers in the Middle East either create documentarian bodies of work or produce the stereotypical images of their societies, and thereby reinforce Western media control of the Middle Eastern region. This paper is a semiotic analysis of photography by Youssef Nabil (Egypt), Walid Ra'ad (Lebanon) and Newsha Tavakolian (Iran) to argue that they are combating the mass media's stereotypical image of the Middle East and Islam by humanizing their photography. They do not portray stereotypes but show subjects in a visual language that is universally relatable. Thus, the paper analyzes the photographs within the cultural and social frameworks in which they were produced.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **03. Fine Arts and Design**

#### **03. Design**

##### **03.03.01 Research -> Process -> Design History**

**Horton, Amanda** *University of Central Oklahoma*

Studio classes are often the highlight of any graphic designer's education, they often become more engaged in the content of these courses than any of the other course that they may take while attending college. So how do we as design historians get that level of engagement in our lecture courses? Additionally research is often a term that students have a strong reaction to, a strong negative reaction. Many students find this term to be intimidating or even downright frightening, trying to avoid completing any research (& the library) at all costs. This paper will tackle both of these issues and show one example of how to engage students into lecture and research through design projects in a course that is typically considered to be a lecture course. The goal of this project is for students to put into practice and to aid the retention of what they have learned in their design history lecture course. When students finally make these connections History of Graphic Design often becomes one of their favorite courses.

##### **03.03.02 Participatory Graphic Design for Safeguarding Cultural Heritage**

**Peters, Siriporn** *Southwestern Oklahoma State University*

This was a collaborative research project with the representatives of Cheyenne and Arapaho nations in Oklahoma. The research aimed to study cultural heritage and create a potential means to help the participant communities to preserve and safeguard their cultural heritage. The research was guided two research questions. The first question was what cultural heritage that the Cheyenne and Arapaho nations intend to preserve and safeguard. The second question was what graphic designers could do to help these nations to preserve and safeguard their cultural heritage effectively. The research methodology was a qualitative research by using participatory research as a research approach. The participants were Cheyenne and Arapaho educators and knowledgeable members. The research findings revealed that the Cheyenne and Arapaho language were the cultural heritage that the participants intend to safeguard and pass on to young generations. As these nations have only spoken language, graphic designers could use visual communication, mass communication, multimedia and online technology to help the participant communities to preserve and pass on their language to younger generation effectively. This research also informed that a participatory graphic design was the most effective approach and process.

### **03.03.03 Participatory Graphic Design for Safeguarding Cultural Heritage**

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### **03.03.04 Illustrated Mascot Trading Cards**

**Washburn,Sam** *University of Central Oklahoma*

The history of graphic design is a large and varied field of study. Advertising design is arguably one of the most important topics in this field. In the study of advertising design one of the most visible projects that a designer can produce for advertising purposes, in terms of widespread exposure, is a mascot. These colorful creations run the gamut from political animals like the Democratic donkey and the Republican elephant, to video game characters like the plucky plumber Mario. The sheer amount of these characters makes study of the major mascots across several time periods a chore for anyone since there is currently no comprehensive source. In order to ease this process, this study seeks to produce a set of illustrated mascot trading cards that are divided into categories that are based on time period and characteristics. The study includes thirteen different mascots broken into five distinct groups: Pioneering Logos, Icons of the 50's, Modern Logos, All-Star Logos, and a Hall of Shame. The mascots chosen for inclusion include famous names like Tony the Tiger, and lesser-known pioneering logos like early Jim Henson creations Wilkins and Wontkins. Each card features an original illustration on the face and educational information on the back that will aid in educating students of graphic design in an interesting way. Ideally, this study will result in a unique educational aid that will help students learn about mascots in a more entertaining and efficient manner.

### **03.03.05 Historic Preservation and Interior Design – Community Engagement at Work**

**Settles, Valerie** *University of Central Oklahoma*

When students have the opportunity to participate in experiential learning and work with clients in the community, they are able to grow as designers while helping others. Experiential learning is an effective technique for developing the effective problem solvers so important to the market in which students will soon be competing; as students engage in these experiences, they gain a better view of “the big picture” so important in motivating them to become more interested in learning, rather than simply completing assignments. This case study follows interior design students in a historic preservation course as they learn about the challenges of preserving older buildings and the role interior designers play while interacting with the local community. Students were asked to develop a design to convert an upper floor in a historic building to residential spaces in a small town. Students organized project groups, developed the program, researched pertinent information, and completed drawings that were presented to the client. Students then completed a reflection exercise that asked them to evaluate what they learned during the course – about historic preservation and themselves as designers. Students who completed the historic preservation course were not only exposed to a potentially new area of specialization, but grew to understand the importance of their role in helping others in the community while maintaining the common culture held within our history.

### **03.03.06 Assessing Adaptability: a Study of International Students in Design Classrooms**

**Vu, Thao** *University of Central Oklahoma*

When the United States is in the direction toward a globally relevant education, universities have an increasing number of international students. There are many obstacles such as cultural barriers for students and changes in teaching for educators. This paper will address if international students in design classrooms are able to think critically and creatively considering the changes they make to adapt to their new learning environment. Acculturation leads to more experience, more perspectives and more innovation. International students and diverse classrooms have for long been seen as the answer to exposing students to cross-cultural concepts. These concepts have been explored in larger contexts. They help us to learn how international students can take advantage of processing acculturation. This paper intends to take a critical look at what the impacts of adapting to a new culture have on international students in design classrooms. For the purpose of having the observations on variety perspectives, the Survey Monkey tool will help collect data from three different groups: international students, design faculties and local students. The result of this study will assess adaptability of international students in design classrooms. In addition, it will attempt to form guidelines for educators to understand the transition curriculum and teaching practices in global view.

### **03.03.07 Get Out of Your Parents' Basement: How to Be a Grown Up in the Design Industry**

**Spradlin,Haley** *University of Central Oklahoma*

The industry of graphic design is fiercely competitive, and if not adequately equipped, a newly graduated designer will be left feeling discouraged, overlooked, and unemployed. Thus, a game plan must be established. Get Out of Your Parents' Basement: How to Be a Grown Up in the Design Industry digs into the advice of esteemed design professionals and employers in order to educate new graduates in the art of adulthood. This campaign includes an app that highlights the initial concerns of freshly graduated young men and women to ensure their confidence going into the professional world. The layout is very tailored to the timing of each problem. Designers could pick and choose what section applies to them at a certain point in their career since each section of the app builds on the last depending on what stage the reader is at in their professional development ensuring success at each stage.

### **03.03.08 Say More Campaign**

**Thurm,Maranda** *University of Central Oklahoma*

The objective of this project is to use the power of design to build a stronger more connected community through the simple act of encouraging UCO students and faculty to have an expressive, face-to-face conversation that is not mediated by technology. The goal of this campaign is to help viewers understand that a conversation held in person and outside the realm of technology is necessary to build a more highly evolved community. At the conclusion of each event students will be asked to fill out an anonymous survey to assess the effectiveness of each individual activity and ask about the student's response to the event. Only perception data and demographic information will be gathered, no information that could be traced back to an individual participant will be collected or stored. Successful completion of this project will: encourage individuals to have a more expressive, engaged conversation without technology; provide different scenarios and venues of where a discussion could take place; focus on helping people make real meaningful connections through communication; create a sense of community for UCO students which may help them be more successful.

### **03.03.09 Make Shit Happen Society Sketchbook**

**Miller,Autumn** *University of Central Oklahoma*

The project that I have been working on, as part of the Make Shit Happen Society, is a Design Student Sketchbook. This sketchbook is unique in that it is divided into twelve different sections: eleven specific project sections, and a semester long planner in the back. The project sections include lined pages for research, the first stage of every project, blank pages for rough sketching ideas, dot grid pages for refining those sketches, and finally, a bulleted list for when the project moves onto the computer and out of the sketchbook. The sections are divided by encouraging hand lettered statements or pieces of advice, and are also accompanied by the small characters that star in the Design Homework Night posters. This sketchbook is created to help guide new design students through the recommended stages of design, and it also serves to strengthen the more seasoned designer's organization skills. The calendar in the back also encourages organization, but it serves a second purpose to promote events within the department, namely, Design Homework Night.

### **03.03.10 It's Simple, Just Scribble**

**Mayhew, Lauren** *University of Central Oklahoma*

This project will raise awareness about the significant benefits of doodling; it can help in the retention and recall of important information, a critical skill for college students, as well as aid in the prevention of Alzheimer's disease. This project will also make clear that anyone can reap these benefits because elevated drawing skills are not required. The simple act of putting pencil or pen to paper and making marks is all that is required. Successful completion of this project will: encourage individuals to look at the act of doodling in a positive light; provide different scenarios in which doodling would be helpful; raise awareness of the long-term health benefits and potentially help improve student's academic performance. All this by Simply Just Scribbling.

### **03.03.11 MAKE SHIT HAPPEN SOCIETY**

**Nguyen, Ti** *University of Central Oklahoma*

The purpose of this project is to promote an event that encourages collaboration and creates connections among design students at the University of Central Oklahoma. The name, Make Shit Happen Society, stems from our student designer's relentless pursuit to finish a project. This project promotes a series of homework nights and other collaborative events open to all design students at all levels. Including students of all levels is very important; for lower level students it provides an opportunity to seek advice; for an upper level junior or senior, it gives him or her a chance to collaborate with and learn from peers. An event, like Homework Night, is ideal because the busy schedule of a full time design student doesn't leave them with much time to attend events without worrying about their homework, but with this event they are able to collaborate and complete their work. The goal of this project, by students for students, is to increase student performance across the program.

### **03.03.12 Design Homework Night**

**Moeckel, Daltyn** *University of Central Oklahoma*

The purpose of this project is to inspire and encourage collaboration between design students at the University of Central Oklahoma. Each month, an inspirational poster is designed, printed and displayed in the department. The posters are primarily aimed towards lower-level design students, but also target upperclassmen. Each poster contains a different piece of advice to encourage students through the program. Illustrated characters reoccur on the posters, representing the upperclassmen giving first and second year students feedback and critique. The posters are also meant to help promote the department's bimonthly Homework Nights. During these events, design students of all levels meet and work on homework together. This allows younger students to learn and get advice from upperclassmen. It also allows students to bounce ideas off one another and get their creative ideas flowing. At each event, students who attend are asked to fill out a short survey. Each student is asked what level they are in the program and their reason for attending the event. Overall, the goal of this project is to increase student participation and performance throughout all levels of the design program.



### **03.03.13 The Economics of Perception**

**Johnson, Amy** *University of Central Oklahoma*

**Ladwig, Sam** *University of Central Oklahoma*

The holographic illusion continues to occupy a strange place in our visual culture. When well constructed and well conceived they can elicit genuine wonder and joy. But when created as a gimmick they can become exploitation such as the recent holographic performances by deceased celebrities Michael Jackson and Tupac. The goal of this project is to create a large scale holographic installation that makes the reality of the digital computer generated file dimensionally visible but tactilely illusive. This play between the 2D electronic file, the 3D projection of the file, and the invisibility of both the object and the software used to make it creates a unique sensory puzzle that will engage the viewer and push the use of holography in art and design and engage viewers in the question, what is real, is it the file or the projection, both or neither? Or is it the feeling the work elicits?

### **03.03.14 The Practicality of Personal Projects**

**Gabbard, Lanie** *University of Central Oklahoma*

Thesis: How personal projects fuel professional growth for creatives. We are living in a professional go-go culture today and do not always take time to allow ourselves to focus on personal projects. But an argument can be made, upon further exploration, that our personal projects have a huge practical benefit to us professionally. If we dig deeper into the wide-spread philosophy that creatives need other creative outlets, we can uncover how we gain from these theories, therefore igniting a new outlook on why they are good for us. Using my personal project as a case study, I will examine the symbiotic relationship between the personal and professional work to explore the role and impact it has on my professional pursuits.

### **03.03.15 The Effect of Smart Office Strategies on Employees' Human Outcomes in South Korea**

**Choi, SeonMi** *University of Central Oklahoma*

An increasing number of giant global businesses in South Korea are embracing Smart Workplace strategies such as flexible-seat, flextime, telecommuting, and remote work to enhance the individual work efficiency and improve effective collaboration and communication. This concept is fairly new and majority of Korean companies still don't think how much design affects the corporate culture. The purpose of this study is to analyze South Korea Smart Workplace design strategies and examine the effect of those strategies on employees' human outcomes. Semi-structured interviews, online survey, field observations and document analyses were conducted in three buildings to collect data. The findings indicated that main strategies of smart office were innovative work process (unassigned seat, flexible time management, mobile work) and innovative workspace (various workstation types, the alternative workspace, service areas). Companies' smart office strategies positively affected on employees' satisfaction, work performance, collaboration, communication and well-being. However, there were still hierarchy relationships among employees and depending on the workstyle and work type, employees needed to work at the signed seat for easy collaboration and communication. This study will be meaningful in the development of a reliable and valid post-occupancy evaluation tool to investigate the relationship between smart office strategies and employees for the future smart w

### **03.03.16 Design Guideline Development for Student Housing Unit Based on the Unit Modular Architectural System in South Korea**

**Kim,Mikyung** *University of Central Oklahoma*

The purpose of this study was to suggest the design guidelines for unit space of student housing based on the unit modular architectural system in South Korea. To develop the design guidelines, field study was conducted to observe the spatial characteristics of 19 cases as a box-typed unit. The survey with college students and in-depth interviews with field experts on unit modular system were performed to better understand the users' needs. The results of this study were as follows: firstly, the students living in the student housing were dissatisfied with the small and narrow unit space, lack of storage closet and laundry drying space, bedroom sharing with dining room and insanitary environment due to the sharing spaces with other students. Secondly, they asked for more storage closets such as built-in furniture for effective space use. For the kitchen and dining room, both ventilation and separation from the bedroom were considered to be important. They also preferred the expansion of sanitary space. From the identified needs, it was found that the single student housing required sharing spaces such as storage zone for personal parcels, convenience store, reading room and rest zone. Based on the above findings, the design guidelines were developed for the unit space, indoor environment and furniture design based on unit modular architectural system.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **03. Fine Arts and Design**

#### **04. Multimedia Design**

##### **03.04.01 Simulations for Military Field Manual Instruction**

**Harrigan,Trevor** *Cameron University*

Militaries have a long standing tradition of simulation and modeling for the training of soldiers and officers. The Prussian Army is noted as one of the first to use war games as a method to plan and refine operations (Dunnigan, 2000). However, according to the National Research Council Committee on Modeling, Simulation, and Games, one of the most compelling cases for game-based aids to the military is for basic skill and situational training. Starting in 2010, the U.S. Army commenced a five-year investment in the development of video games as part of its Games for Training program (Jenkins, 2008). In addition to this, the U.S. Army is investigating all other forms of interactive media and games for a wide range of training purposes. The purpose of this research is to explore the potential of interactive, scenario-based simulations, developed along instructional design technology principles, in order to teach learners content found in U.S. Army Field Manuals.

##### **03.04.02 Physics in Video Games**

**Cook,Justin** *Cameron University*

The physics in a majority of video games differ greatly from the rules of physics that you might learn from a textbook. Most games are made to entertain the player and thus each game has different rules for physics. These rules may also change at any moment during the game. For example, if one pushed a ball down a hill, the ball would roll to the bottom of the hill. However, in a video game, the ball may only roll halfway down the hill before stopping or doing something else. The purpose of this research is to determine the difference between the use of physics in the real world and video games. A literary review was conducted to determine what type of video game physics are being used and altered for gaming purposes. Anyone who has played Halo has probably noticed, Master Chief jumps much higher and at a slower speed than a normal human thus allowing the player to aim while jumping. This research will explain what makes video games so entertaining for players, through application of having their own unique laws of physics.

### **03.04.03 Improvement of Art Galleries through interactive displays**

**Shepherd,Amber** *Cameron University*

Artist Statement: Art galleries around the world are expanding their installations with the aid of interactive art and digital media. Viewing artwork turned into interactive displays that allow for visitors to fully immerse themselves into the experience. As an extension of their art interpretation and visitor outreach programs, Cleveland Museum of Art (CMA) has expanded their art galleries to include touch screens and interactive displays. Applications of technology gives each guest a chance to personalize their own visit; allowing for different ages and lifestyles, they experience art in a way that is unique to them.

### **03.04.04 Curtailing Gun Violence through Education**

**Miller,Sonnie** *Cameron University*

Artist Statement: The recent series of firearm related incidents in our schools and cities has caused many to call for action to find solutions to this problem. The "shoot first, ask questions later" mentality is proof that we need educational programs taught in the schools as well as the private sector. An Oregon NRA certified instructor teaches children firearm safety and requires a parent to attend the class with their child. There are diverse programs such as the NRA's Eddie the Eagle program that teach firearm safety. While none are perfect, they all impact children's views and actions on the safe use of firearms. Some school districts are looking at the possibility of adding firearm safety classes to the curriculum alongside sex education and physical education. My literary review suggests that more research is needed to determine the effectiveness of firearm safety programs for children.

### **03.04.05 Preventing Bullying**

**Jackson,Karisha** *Cameron University*

In most elementary and middle schools across the country, bullying is a social issue. At some point during adolescence almost everybody has experienced some type of bullying. Nearly 28% of all students ages 12-18 reported being bullied physically, verbally, or online at least once during the survey year, according to one U.S. Department of Education report (2013). Bullying victimizes a certain person or particular group. Bullying causes depression, suicidal thoughts, low self-esteem, and loneliness. With social media sites being so popular, the bullying does not stop at the school, it continues into people's homes through the internet as well. The results of this study will display ways to prevent and reduce bullying.

### **03.04.06 Gamification from Action Script to Execution**

**Wright Smith,Linda** *Cameron University*

Artist Statement: Gamification has been used for creating marketing, educational, and training artifacts that attract and maintain target audiences' attention and interactive involvement in the gaming assets. So what is gamification? "Gamification involves the identification, extraction, and application of individual game elements or limited, meaningful combination of these elements" (pg. 754, Landers, Richard, Developing a Theory of Gamified Learning: "Linking Serious Games and Gamification of Learning," Simulation & Gaming 2014, Vol. 45(6) 752-768.) The Illustrations below review the elements of gamification through the development process of one interactive simulation.

### **03.04.07 The Benefits of Children and Pet Interactions**

**Northrip, Jessica** *Cameron University*

ARTIST STATEMENT: Young children show competence when choosing among multiple plans of action. They are even using trial and error for discovery learning. It has been shown that a child's involvement with a pet can open the door to social interaction, reading, speaking, and learning. Interactive digital pets can help a child's development when an actual pet is too overwhelming or unwelcome in the home. Digital interactive pet care simulations are less competitive in comparison with the majority of today's games. Digital interactive pet care games have little negative influence on a child. The simulation does show the cause and effects of a child's treatment of a live pet without the possibility of allergies, occasional accidents, or misplacement of the pet. A pet care simulation is not only perceived as fun for children, it can also help build the basic knowledge of taking care of a pet, before owning one.

### **03.04.09 Do You Have What it Takes to be a Photographic Sharpshooter?**

**Mace, James** *Cameron University*

Artist Statement: Since the partial successful creation of a photographic image by Nicéphore Niépce in 1816, technology has improved to the point that today's inexpensive digital cameras can capture millions of bytes of information to create high quality pictures. Many believe they are brilliant photographers although they lack the basic skills needed to create photographic art pieces. My experiential simulation will help people learn the basics of good photographic techniques while going on an imaginary photographic adventure.

### **03.04.10 Comic Book Style Simulations**

**Dayhoff, Kaytlen** *Cameron University*

I was elected to create a mini comic book due to my intrigue in graphic arts and for superheroes. The book would be a short story with user-interactive choices that could potentially change the entire story all together. To research this, I had to first think about the way this project should look. It was going to be a comic book, that was simple enough to understand, but there was more information required before I could get started. I found a few websites online, detailing the structure and layout designs of common comic book pages. These articles showed examples, provided downloads, and also gave measurements that would help me to create my very own blank comic page. The pages can be any number of shapes and patterns, having one full page of graphics, or three sub-boxes in the corner; the results are endless. Most comic book structure today are drawn at a 10 X 15" ratio, so the tricky part is, just getting everything else to fit inside. The visual parts of the process will take more time and practice to accomplish. A few pdfs also went into the research, such as "Illustrating Praxis: comic Composition, Narrative Rhetoric, and Critical Multiliteracies," by Kathryn Comer. In her article, Comer talks about how comics are more focused on reading then they are as a visual. While the major separating factor of a normal book to a comic book is in fact the graphic designs, it is true that the comics would be nothing without the narrative.

### **03.04.11 Prejudice-Reduction Simulations**

**Johnson,William** *Cameron University*

There have been many problems dealing with race for countless years now. One group getting treated unfairly and the other group like kings and queens. What if the shoe was on the other foot? In 1968 a third grade teacher named Jane Elliott conducted an experiment called Blue Eyes-Brown Eyes. "For one day the blue-eyed children were treated unfairly and ridiculed (e.g., given shorter recess time than other students, told they were lazy) while brown-eyed students were praised and given privileges (Byrnes & Kiger, 1992)." This study showed kids and adults understand the effects of prejudice better when they have witnessed it firsthand. Prejudice-reduction simulations have been known to change people's attitudes while having an impactful meaning on their lives.

### **03.04.12 Learning history through simulation**

**Omer,Mohammed** *Cameron University*

At the end of the 14th century there started a new European resurgence of intellectual and artistic activities that became known as the Renaissance. While the Renaissance provided us with beautiful art, fantastic ideas for science and intellectual research, many high school students are not excited about taking history classes. When asked why they are not interested in taking history classes, students identified the subject matter and the teaching methods as boring. In my experiential simulation, I will have students' time travel back to 15th century Italy to experience the vibrant changes that were taking place because of the intellectual, scientific and artistic creativity taking place at that time.

### **03.04.13 Web Development Team: The Roles, Responsibilities, Relationship**

**johari,abbas** *Cameron University*

**Shepherd,Amber** *Cameron University*

**Miller,Sonnie** *Cameron University*

An ongoing university capstone project includes teams to compete with each other and develop an authentic site for local corporate partners. Managing students with different skill sets and majors has been a challenge. This presentation reports on an ongoing study that examines the important role of a team leader in fostering intrinsic motivation by arranging her team, designing roles, and speaking to learners in ways that meet their needs for relationships. The theoretical framework for the study includes self-determination theory (Deci & Ryan, 1985, 1991). Self-determination theory focuses on three innate human needs: competence, autonomy, and relationship. The Grounded Theory method of qualitative research is selected to obtain and analyze the data. Our anticipated results would be an increase in students' relationship needs and hence satisfying connections with their peers and teachers.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **03. Fine Arts and Design**

#### **05. Music**

##### **03.05.01 MUSIC FOR PEACE: A CD RECORDING AND PUBLIC SCHOOL INITIATIVE**

**Remy-Schumacher, Tess** *University of Central Oklahoma*

In 2013, Dr. Brian Lamb, conductor of the UCO Wind Symphony, and I were part of a commissioning consortium for a new cello concerto by David Maslanka. The beauty of the completed score was overwhelming. Only later did I learn about the horrific scene described in Maslanka's program notes. While struggling with this contrast I understood the music's healing effects on the human soul, in Maslanka's words: "Musical Vibration heals". Shortly after the premiere I felt the mission to bring this concerto to more people, young students in particular, and my "Music for Peace" public schools concert Initiative was born. I selected additional works for "Music for Peace"; all have a strong message: expressing peace, tolerance and believing in the good of human beings. In addition I commissioned a piece based on and inspired by a graduation speech of Maya Angelou for use in this project "Forgive". With the reported increase of violence and bullying in our public schools "Music for Peace" seeks to lead students to better choices and a life of tolerance, love and forgiveness. As a public school initiative, made possible in part by a research grant from UCO, this project offers a solution through music and lyrics, live performances, discussions, active student involvement and feedback surveys. This album "Music for Peace" is the result of this initiative and a thank you to all students and teachers who

### **03.05.02 CD Recording of Select Solo Bassoon and Chamber Music Composed by Bill Douglas**

**Wooden, Lori** *University of Central Oklahoma*

**Daye, Yvonne** *University of Central Oklahoma*

**Pappas, Abigail** *University of Central Oklahoma*

Recently, the number of young students who have elected to begin study on the bassoon has dwindled. The bassoon is considered to be one of the “endangered” instruments; those instruments that few students are playing, that are not being supported and promoted in school music programs, and whose absence is being felt at the collegiate and community levels. The CD of select compositions by Bill Douglas whose style of composition utilizes elements of jazz and world music (two genres not normally associated with the double reed instruments) will be distributed to school music directors and students via recruitment and outreach activities in an effort to encourage music students to begin to play the bassoon. The CD will be free of charge to accommodate music programs and students of all levels of income and budgetary constraints. If more young students to begin playing the bassoon, with the goals of lifetime music making and healthy school and community music programs, the result will be well rounded and balanced community orchestras and bands that contribute in numerous ways to the cultural experience, identity, and civic pride of the community.

### **03.05.03 Trios: Connections Commissioning, Performing and Recording of Chamber Music**

**Lindblade, Dawn** *University of Central Oklahoma*

**Mundende, Kangwa** *University of Central Oklahoma*

**Pappas, Abigail** *University of Central Oklahoma*

**English, Melissa** *University of Central Oklahoma*

**Short, Madelynne** *University of Central Oklahoma*

This project funded the recording of six contemporary works for four varied faculty trios (Lupine, Post Oak, Otis and Sugar Fish) at the University of Central Oklahoma. UCO student composer, Kangwe Mundende, and UCO alumni composer, Paul Sweet, wrote three new works premiered and recorded alongside three previously commissioned works by Dr. Sam Magrill (UCO Composer in Residence), Dr. Roger Petersen, and Shu-hua Zhu. The goal of this project was threefold, to finance and support the composition of contemporary chamber works, to work towards establishing the University of Central Oklahoma as a crucial member of the Oklahoma arts community, and to provide an opportunity for students to see the creative process of commissioning, performing and recording chamber music. Students collaborated with faculty mentors to achieve the objectives of the project through direct participation in the creation of a piece of music, assisting with the recording session, and through contact with both the composers and performers. The final portion of the project was the design and marketing of the completed CD and liner notes. Research Assistants: Kangwa Mundende, Abigail Pappas, Madelynne Short and Melissa English



## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **04. Liberal Arts**

#### **01. Communication**

##### **04.01.01 “My College Education Has Come From My Participation in the Forensics Team”: An Examination of the Skills and Benefits of Collegiate Forensic Participation**

**Copeland, Kristopher** *Northeastern State University*

**James, Kendrea** *Northeastern State University*

This qualitative study explored the educational benefits and skills that students perceive they develop by participating in forensics. Qualitative interviews were conducted with 19 students that were in the process of competing in speech and debate. Participants discussed multiple benefits of participating in forensics, such as improving skills in public speaking, communication, organization and structure, networking, time management, group work, and increasing knowledge and broadening worldview. Additionally, participants explained how the skills developed in forensics related to educational and professional experiences. The findings suggest forensic educators should effectively promote the skills and benefits developed in the activity with colleagues, administrators, and outside stakeholders.

##### **04.01.03 An Analysis of Richard Nixon’s Ethical Failure**

**Binnings, Corrine** *Cameron University*

Corrine Binnings Cameron University An Analysis of Richard Nixon’s Ethical Failure The purpose of this research was to analyze Nixon’s ethical failure as an act of volition by examining his actions, highlighting the implications of his actions, and discussing his actions from an ethical standpoint. Nixon authorized the burglarizing and wiretapping of the offices of the Democratic National Committee and later attempted to cover up his involvement. So wide spread was the impact of Nixon’s actions that the incident became known as the Watergate Scandal. Comparing Nixon’s actions with the tenets of moral and ethical theorist, this research proves that Nixon’s actions were willful(volitional). An analysis of Nixon’s actions, based on theories of ethics and facts presented by historians and scholars, shows that Nixon intended to use his executive power to cover up and avoid punishment for his unethical acts. These actions were volitional because there was a clear choice between achieving his desires ethically and achieving them unethically; he chose to take the unethical route. When viewed in light of theories on ethical and moral behavior, Nixon’s actions show a disregard for ethics and an abuse of his post as president. When leaders deviate from the moral requirements of their office, there are serious implications for society and for the offices they hold.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **04. Liberal Arts**

#### **02. English**

##### **04.02.01 The Marxist viewpoint of social issues in the literary context of Joseph Andrews by Henry Fielding.**

**Nguyen, Julie** *Cameron University*

Marxist criticism fits very well into Henry Fielding's *Joseph Andrews* because there are numerous public problems that are presented throughout the novel. It is possible that Fielding was trying to expose some of the social problems because he had written pamphlets and essays regarding the social difficulties during this time period. Therefore, *Joseph Andrews* might be a taste of Fielding's view about the problems in eighteenth century English society. Some of the social problems in *Joseph Andrews* are a lack of formal education, poor local law enforcement regulation, and pointless laws for debtors. The main theme of social issues is the "conflict of social classes" that pertains to the Marxist theory (Selden 83). It is possible that the conflict of social classes is a power struggle between the lower and upper classes. The upper class would need to invest heavily in order to improve the standard of living among the lower class. Arguably, Marxist criticism applies to the British social problems in *Joseph Andrews* because of the dominion of upper class on the lower class. Thus, the ruling class would want to help the lower class if it benefits the upper class. Works Cited Selden, Raman. "Marxist theories." *Reader's Guide to Contemporary Literary Theory*. Fifth ed. Harlow England: Pearson Education Limited, 2005. 82-114. Print.

##### **04.02.02 The Flat and the Fridged: Females in Film**

**Mirll, Teresa** *University of Central Oklahoma*

This presentation focuses on the imbalanced representation of female characters in American cinema. The presenter uses a multitude of examples to illustrate the normal roles for women in motion pictures, including images that range from famous films in the 1970s such as the classic *Star Wars* trilogy to more contemporary movies like the Academy-Award winning trilogy *The Lord of the Rings* and the 2015 summer success, *Jurassic World*. The presentation first outlines the feminist observations of Alison Bechdel and her three-step test for female equality in film. Next, the presenter discusses Kelly Sue DeConnick's test for strong female characters, which ensures the women play a significant role in the story. Thirdly, the presentation explains Gail Simone's objections against "fridging" female characters, or in other words, mutilating or murdering women to shape a male character's story arc. Finally, in order to demonstrate the problem that Hollywood's style of storytelling causes actresses as well as viewers of any gender or society, the presenter provides a discussion of the findings from Dr. Martha Lauzen's 16th Annual Celluloid Ceiling Report, which pinpoint the lack of female input in creating these women characters behind the scenes as well as on screen. The conclusion of this presentation stresses the importance of feminism in film as well as the real-life positive outcomes of equality between the genders.

### **04.02.03 Poetic Photography: The Photograph as the Foundation for Poetry**

**Eden Long, Katelyn** *University of Central Oklahoma*

Poets approach the creation of their poetry in unique, vastly varying, and individual ways, such as via external poetry prompts, imitation of other poets' works, or by structuring their works after specific poetic forms. However, some of the most powerful poems result from poets responding to or in some way interacting with another art form, such as painting, sculpture, glass blowing, dance, and other mediums. One such medium that greatly influences the genre of poetry is photography, and specifically, the intersection of poetic language and imagery derived from photography. This presentation delves into this powerful intersection of poetry and photography through the collected photography of Eudora Welty entitled *Photographs*, which explores Southern culture and the Great Depression era, and the author's original poems that in some way respond to Welty's works. Additionally, this presentation explores the poetic persona and narrative drive that are further emphasized by the addition of photography in the initial conception of the poem.

### **04.02.04 The Repercussions of Uncle Tom's Cabin**

**Gregory, Allyson** *East Central University*

*Uncle Tom's Cabin* is a novel written by Harriet Beecher Stowe. This novel is arguably one of the most influential pieces of literature in America's history. Harriet Beecher Stowe had many objectives when writing this novel, some of them being to end slavery, to be a missionary through the text, and to show others how well the Northern economy was working. This novel gained popularity almost overnight and it also sparked a multitude of reactions from not only Northerners and Southerners, but from people all around the world.

### **04.02.05 A Changing Reality: Gender and Social Roles as Expressed in Irving's "The Legend of Sleepy Hollow"**

**Tarpey, Karina** *East Central University*

I chose to do my research over the social and gender roles of the nineteenth century as expressed in "The Legend of Sleepy Hollow" by Washington Irving through the three main characters, Ichabod Crane, Brom Bones and Katrina Van Tassel. Washington Irving was famous for his thought evoking tales incorporating every bit of strife and culture happening around him in the time period of his authorship. "The Legend of Sleepy Hollow" can be read many different ways, I have chosen to read, and support, it as a story of gender and social evolution, in which the main character is the emerging forms of both. Ichabod Crane dared to embody homophobia in its finest non-sexual case in the nineteenth century. Mr. Irving's character challenged and threatened people's gender identity without many people understanding why they felt threatened. Think of all the people that read "The Legend of Sleepy Hollow" and despised Ichabod for no apparent reason, only explainable by psychology? The rivalry between Brom Bones and Ichabod Crane in conjunction with the love triangle encompassing Katrina Van Tassel entails the extreme evolution and gap between the gender and social roles prior to the nineteenth century, and those that emerged during and after the nineteenth century.

## 04.02.06 The Relationship of Culture to Natural and Constructed Languages

**Salmon, Erika** *Northeastern State University*

Objective. This study examines the interdependence of language and culture, focusing on constructed languages (conlangs) created for fictional worlds (conworlds). Throughout world history, people have labored to maintain and preserve languages (e.x. Wycliffe Bible Translators, Smithsonian Institute), or conversely to stamp them out, e.x. during wartime and conquest. Thesis. Beyond simple communication, spoken language is a crucial part of individual and collective identity. Methods. This study analyzes natural and constructed languages and considers the attitudes people have toward them. Specifically, it looks at Romance, East Asian, and Native American languages, Dothraki, Quenya, and Ukutuk. Results. Elements of language such as evidentials, register, kinship terms, terms of address, and noun classification embody a worldview unique to its speakers. Conclusion. The ideas and values reflected in languages themselves demonstrate how closely language and culture are tied. Given the importance of natural language to culture and identity, conlangs can help develop rich, diverse conworlds.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **04. Liberal Arts**

#### **05. Geography**

##### **04.05.01 Analyzing the Feasibility of Sheltered Bus Stops on the Edmond Citylink Bus Routes with Geographic Information Systems**

**Watkins,Brad** *University of Central Oklahoma*

**Chopra,Nagesh** *University of Central Oklahoma*

The Edmond Citylink is a free public transportation bus service used by commuters to gain access to key locations within and outside the city limits. The onus of providing an effective and efficient bus service rests on the local government such that they satisfy the requirements of users as well as service providers within the limited resource constraints. However, the lack of adequate sheltered bus stops combined with inclement Oklahoma weather raises significant challenges to the main users of this civic service. This study uses geographic information systems (GIS) to analyze the alternatives available for rider comfort. The authors mapped the five routes and stops of the Edmond Citylink bus service. It was found that out of the 32 bus stops, only six have shelters while the rest have benches. Nearby buildings and/or trees along the unsheltered bus stops offered little or no protection from severe weather. Ultimately, the City of Edmond will need to break down the traditional barriers of fragmentation to find a middle ground that improves the basic infrastructure of Citylink (sheltered bus stops).

##### **04.05.02 The Historical Distribution of Eastern Red Cedar (*Juniperus virginiana* L.) at the University of Central Oklahoma's Selman Living Laboratory**

**McGregor,Erin** *University of Central Oklahoma*

**Watkins,Brad** *University of Central Oklahoma*

Eastern red cedar (*Juniperus virginiana* L.) is an invasive species currently encroaching into mixed grass prairies of western Oklahoma. Native to the state, it historically was limited to streambanks and other sheltered areas in prairies, for example, rock outcrops. Understanding the dynamics of plant communities within the context of landscape is critical and leads to better environmental protection. The earlier distributions of eastern red cedar when compared to the current distribution can inform the development of management strategies. The goals of this study are to determine the historical trend, rate of encroachment and the conditions under which eastern red cedar became established in mixed-grass prairies at the western limit of its range in Oklahoma. The authors are utilizing geographic information systems (GIS) to map the landscape-level encroachment of eastern red cedar in a mixed-grass prairie by using georeferenced time-series aerial imagery from 1959, 1965, 1973, 1984, 1990, 2003 and 2013.

#### **04.05.03 GIS for Rural Community Development: Vegetation Management and Fire Safety Assets in Cedar Valley West, Oklahoma**

**Wieczorek-Pemberton, Mila** *University of Central Oklahoma*

**Harris, Maxton** *University of Central Oklahoma*

**Watkins, Brad** *University of Central Oklahoma*

Geographic information systems (GIS) is an important tool for community development and management. The authors built a GIS database containing fire safety assets (fire hydrants and water pipelines) and the vegetation structure and management of eastern red cedar (*Juniperus virginiana*, L.) trees within Cedar Valley West, Oklahoma. In addition to analysis, GIS provides mapping and visualization capabilities for effective communication of results. We analyzed the spatial properties of fire safety assets and vegetation distribution in relation to built structures within the community. Through fieldwork and research, we built a spatial database that can be used for community planning, development, and management. The results of this project have been used to attain grant funds to expand the fire safety infrastructure in Cedar Valley West, Oklahoma.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **04. Liberal Arts**

#### **07. History**

##### **04.07.01 When Philanthropy Flops**

**Culpepper, Megan** *University of Central Oklahoma*

**Sheetz-Nguyen, Jessica** *University of Central Oklahoma*

Abstract: This research examines the effectiveness of philanthropy and the uneven distribution of money based on gender according to records centered on British female orphans. Understanding the distribution of money based on gender is important for philanthropy as a whole. There are many philanthropies who want to make a difference in the world. When viewed from a historical business perspective, philanthropies will be critiqued in a way that encourages future improvement. Companies that give out money claiming philanthropic activities should be monitored for efficiencies in money distributions and effectiveness on targeted populations. Knowing that different populations effect other groups is important when factoring effectiveness of philanthropic giving.

##### **04.07.02 African American Masculinity and the Lynching of William Brown**

**Ritt, Edith** *University of Central Oklahoma*

My research will examine views of black masculinity in America during the early twentieth century. It explores how the media and society perpetuates the negative perception of African American males. White males dominated American social hierarchy due to perceived supremacy. In order to maintain control, white males suppressed black masculinity. The lynching of William Brown is an example of American society's fear and subsequent persecution of black masculinity. This lynching represents the culmination of racial tensions due to the perceived threat towards white masculinity, particularly during the Red Summer of 1919. Last semester I traveled to Omaha, Nebraska and worked in the archives at the Douglas County Historical Society, W. Dale Clark library, and the Nebraska State Historical Society. This gave me an opportunity to explore the case of William Brown. I hope to continue my research regarding African American masculinity for my masters thesis.

#### **04.07.03 FROM the LAND RUN to the GOVERNOR'S MANSION: OKLAHOMA WOMEN and POLITICAL PARITY, 1889-2015**

**Beck,Rhonda** *University of Central Oklahoma*

The Land Run of 1889 marks a well-defined usefulness wherein the women of the Oklahoma Territory began to stand as politically affiliated individuals in crafting both the state and constitution in 1907. These women were dedicated to taking action and lobbying for advancement, not only for suffrage, but also beyond the constraints of societal pressures in a southern border state. From Kate Barnard as the first Oklahoma Commissioner of Charities and Corrections to Governor Mary Fallin, the arduous path to success has been provoked with various obstructions. Presently, women in Oklahoma occupy 51 percent of the state's population and continually fall short in representation in legislative positions. Why is this so in Oklahoma? By utilizing sources from scholars such as Cindy Simon Rosenthal, Doris Weatherford, Marianne Schnall, and state records, this research examines the accomplishments of women in Oklahoma, and then seeks to ask what Oklahomans themselves genuinely expect from women's political leadership. These results will add to scholarship in finding solutions for stronger representation of women in Oklahoma and lead to increased encouragement of female involvement, contributions, and legislative membership. Political parity for gender is beneficial for all members of society and the design of how we need to continue democracy.

#### **04.07.04 From Missions to Facebook: Catholic Nuns and Sisters in Oklahoma, 1870 – 2015**

**Hatherley,Sherry** *University of Central Oklahoma*

Catholic nuns and sisters have a rich history in Oklahoma. These remarkable women have played an integral role in the growth of Oklahoma and recognition of the importance of them and their accomplishments is long overdue. Since their arrival in 1874, the Sisters of Mercy began educating children, and later they and the Sisters of St. Francis founded two of the largest healthcare systems within the state. Other orders continued to work in education and moved into serving Native American populations, as well as the homeless, the elderly and other disenfranchised persons. This project documents the history and contributions these women provided from their arrival in Sacred Heart, Oklahoma in 1874 through today. Primary sources for information include interviews, shadowing, memoirs, monographs, newsletters and correspondence. This information was compiled to build a history of the nuns and sisters, their orders, and their works and contributions to Oklahoma, both before and after statehood. Sisters and nuns have worked quietly in the background serving, educating and healing Oklahoman's for over one hundred years. It is time they and their achievements are recognized.

#### **04.07.05 World War II Widows: The Neglected Survivors**

**Hewitt,Olivia** *University of Central Oklahoma*

Near the end of World War II, President Franklin D. Roosevelt signed the Servicemen's Readjustment Act into law. This act, also known as the GI Bill, rewarded returning American veterans. From home and business loans to educational assistance, the GI Bill assisted former military men in achieving a secure financial future. Nevertheless, not every soldier lived to come home to his or her family, resulting in over 206,500 widows and orphans who did not qualify for benefits the new GI Bill offered. In 1948, war widows organized and lobbied for an extension of the GI Bill. While the congressmen agreed the widows and orphans needed financial support, they were uncertain an extension of the bill would be appropriate. Traditional roles of marriage and costs weighed on the decision. Consequently, war widows would not receive educational benefits until 1968. Through examining newspaper articles, letters from widows and testimonies at congressional hearings, this paper will argue how surviving dependents were dishonored and mistreated when not achieving immediate support.



#### **04.07.06 How the United States Won the Bid and Prepared For the 1994 World Cup, 1983-1994**

**Salkeld,Patrick** *University of Central Oklahoma*

This paper argues that during the Cold War, Americans viewed immigrants and Communists with disdain, but President Ronald Reagan helped US Soccer generate sufficient interest in soccer using nationalism and patriotism in order for the FIFA to give the United States the opportunity to host the 1994 World Cup. It addresses questions, such as: What role did Reagan play in the American soccer rebirth? Why did he promote soccer, a typically European and ethnic sport? What did US Soccer overcome to promote the 1994 World Cup? Why did FIFA choose the United States to host the 1994 World Cup? To answer these questions, the author accessed archival material from the Reagan Presidential Library and the LA84 Foundation, secondary sources, and government documents. Aside from these documents, little information exists. The USSF archives remain inaccessible because of the National Soccer Hall of Fame's closure in 2010, which forced the archivists to pack the materials and send them to a warehouse in North Carolina. The majority of Americans fail to understand soccer's extensive history in the United States starting in the late nineteenth century, and few secondary sources detail Reagan's involvement in the attempts to host a World Cup. Even though Americans at the time discredited soccer, Reagan saw the sport's benefits, so he fully supported both the 1986 and 1994 World Cup Bids by US Soccer.

#### **04.07.07 To End a Genocide: The Clinton Administration's Effort to End the War in Bosnia, July -December 1995**

**Mcneil,Aaron** *University of Central Oklahoma*

In 1992, the world watched while Bosnia & Herzegovina, a former region of Yugoslavia erupted into Civil War. The United States under the Clinton Administration played a minor role in the early stages of the conflict, understanding what kept the U.S. out is a question that is essential to the policy that Clinton would later adopt. However, the U.S. response changed in July 1995 due to a massacre in the city of Srebrenica; where units of the Bosnian Serb Army of Republika Srpska under the command of General Ratko Mladic removed thousands of Muslim women and children from the city and murdered over eight thousand men. By analyzing interviews, diplomatic wires, memoirs, phone conversions, letters, and unclassified intelligence from the Clinton Presidential Library and building on research from scholars Dr. Ryan C. Hendrickson and the late Eric Markusen, we start to understand how the United States was able to change course and bring the war to an end by December of 1995. This research argues that, though sped up with the massacre in Srebrenica, the Clinton Administration had already laid out plans to help stop the bloodshed and bring the war in Bosnia to a peaceful conclusion.

#### **04.07.08 Criminality and Irish Women in Victorian London**

**Dahl,Elizabeth** *University of Central Oklahoma*

Irish women in Victorian London (1837-1901), were incarcerated at exceedingly higher rates than their English counterparts. The higher incarceration rates can be explained by increased policing within Irish neighborhoods, the institutionalized bias of officials within the English court systems and the poor socio-economic conditions of many Irish families. The portrayal of Irish women in the press was largely negative. Irish women were often referred to as thieves, with mention of loose moral characteristics as being intrinsic to their identity, or "what it means to be Irish." An essential component in the research of incarceration and criminal activities of Irish women in Victorian London is the way in which women appeared in British newspapers and British periodicals. This project will present findings that are currently in progress. It will include a compilation of data housed in an extensive database. The categories of analysis will include, mapping the historical geography of crime in London, crime among Irish women, their ages, criminal classifications and punishments.

#### **04.07.09 Wilma Mankiller and the Influence of Feminism on Cherokee Nation Politics (1985-1995)**

**Whitebird,Alona** *University of Central Oklahoma*

#### **04.07.10 Florence Nightingale: How Travel Shaped a Feminist Icon**

**Riepl,Lauren** *University of Central Oklahoma*

This research investigates the influences on Florence Nightingale and what encouraged her to step outside the predetermined Victorian life set up by her family. The nineteenth century proved to be a pivotal period in the development of what would later become the women's movement. The goal is to show how Florence's heightened education, close relationship with her father, and specifically her extensive travel tendered the courage she needed to succeed in her lifelong call to service. Nightingale spent several years traveling with family friends, Selena and Charles Bracebridge, a couple who gave her unfettered freedom to explore the ancient cities of Rome, Athens, and Alexandria. In her youth she and her family took the Grand Tour and exposed her to Italian and French intellectuals and exiles during the Risorgimento in Italy. Most prior research on Nightingale focuses on her life after she gained recognition for her work during the Crimean War and contribution to the fields of medicine and nursing. This focus inadvertently undermines the significance of unfettered movement and intellectual ventures that influenced her determination change the face of modern medicine. What powerful forces she explored to become a founding feminist, a pioneer in medicine, and a staunch advocate for constant scholarly pursuits.

#### **04.07.11 The Role of Women in the Repeal of Prohibition 1890's-1950's**

**Marlow-Fuson,Skylar** *University of Central Oklahoma*

When thinking of women involved in prohibition, many only think of those fighting for it in the Anti Saloon League. However, there were many women against such legislation who played a crucial role in getting it repealed. The bulk of my research has been conducted through primary sources. The most prominent source of information I found in New York Times articles from the 1920's-1950's. I also found a lot of information from the Oklahoma Historical Society, that gave me access to local newspapers. In addition, I utilized secondary sources such as books and journal articles that analyzed women's role in prohibition. To summarize what I have learned: Prohibition came into effect because many thought it would make the country safer. Many women were in the Anti Saloon League and the like to keep prohibition legislation intact. However, as time went on, prohibition began to have a highly negative effect on women and their families. Violence with bootleggers became prominent, along with deaths from drinking poisonous alcohols. Along with these reasons, many women thought that prohibition hindered their personal liberties founded in the Constitution. So with that, certain women fought against the Anti Saloon League creating their own groups, such as the Molly Pitcher's Club and Women's Organization for National Prohibition Reform. With the leadership of Pauline Morton Sabine and others, these women played a crucial role in the repeal of prohibition

#### **04.07.12 Vox Populi: Subjectivity and the Voices of the Poor**

**Harvey, Phillip** *University of Central Oklahoma*

“What is to be done?” Incarnated in by both Tolstoy and Lenin, is the question of poverty and the search for a solution. There is no era of human history more famous for its pursuit of that solution than that of England and Poor Law. However, there is little extant research on the language of poverty stemming from the Victorian era. Based on in-depth, evidence-based research of speech patterns Henry Mayhew with written autobiographical accounts from people living in London between 1830–1870, this project seeks to define the subjective experience of poverty—in the poor’s own words. My criteria for creating this definition will involve cataloging exact word choice in written texts, anomalous syntactical structures, and orthographical representations of dialect. Additionally, chronological distance requires a further nuanced understanding of historical actors and their voices—of the forces shaping the lives of the poor. To capture the everyday speech of the working classes, my research needs a different tack from traditional scholarship that focuses on text at face value. My research hinges on uncovering an intimate understanding of what it means to be poor in London. Not the factual realities of poverty which are readily available thanks to Victorian sociologists, but the intimate, unguarded expressions of people who were living it. This research into the subjective voices of the past will produce insights into the voices of today. Poverty re

#### **04.07.13 ‘All Due Consideration’: Britain and the Restriction of American Trade during the First World War**

**Olmstead, Justin** *University of Central Oklahoma*

In August 1914 Britain set the Royal Navy to its wartime task of strangling German commerce and declared its intent to stop both legal and contraband goods from arriving in Germany. The ensuing argument with the United States and other neutral countries about what was to be considered contraband and what was not, led Britain to construct new definitions of these items. The British Foreign Office also shifted the burden of proof regarding the shipment of contraband items to ship owners. With these changes the British Foreign Office forced the United States to protest British modifications to international law and not the actual interference with American trade. This paper will examine the role of the British Foreign Office in developing a mind-set of neglect in U. S. policy regarding the British blockade of Germany and the maritime transportation of goods. It will do so by demonstrating that British diplomats were able to change the focus of U.S. complaints about the blockade from one of international legality to a concern for American public opinion. This paper will also analyze the effective use of the definition contraband goods by the British to maintain their blockade.

#### **04.07.14 Does Intermarriage Qualify Caucasian Spouses to Chickasaw Tribal Membership?: Intermarriage During the Allotment Period**

**Lippard, Delaney** *East Central University*

This research explores the issue of quantifying the identity of those who intermarried with Chickasaw tribal members during the late nineteenth century in the United States of America. The project analyzes the court room transcriptions of Caucasian individuals contesting their rights to tribal citizenship in the Chickasaw nation. To gain proficiency in the subject matter, as well as for comparison, the research also relies on Choctaw Nation court records involving intermarried Caucasians and Choctaw citizens. Many Caucasian individuals were involved in legitimate marriages with Chickasaw citizens and were willing to fight for their rights to Chickasaw citizenship, as well as an allotment, by way of their intermarriage. However, there were numerous cases of fraudulent marriages that were solely formed to gain citizenship and an allotment of land. The research details the process of proving citizenship by intermarriage, as well as the effects investigating intermarriage cases had on the Chickasaw Nation.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **04. Liberal Arts**

#### **08. Political Science**

##### **04.08.01 Arafat to Abbas: Toward a Palestinian State**

**Van Den Handel, Cheryl** *Northeastern State University*

The purpose of this research is to determine if changes in leadership in the Palestinian Authority and Israel will bring the two sides closer to a “critical mass” favoring a two-state solution. The principal query asks whether there exists a sufficiently large coalition in Israel and the Palestinian territories that favors the establishment of a Palestinian state in the West Bank and Gaza. A critical assumption underlying this research is that municipal and parliamentary elections in the Palestinian territories would serve as an institutional vehicle for easing many of the Fatah Old Guard leaders out of senior positions within Fatah and the PA. Elections would become a new touchstone of political legitimacy, the vehicle by which the Palestinian population would gradually be able to exercise of self-determination. Another assumption is that the Palestinian Authority’s ability to halt militancy would facilitate the legitimacy of the Palestinian government. Given the divisions and domestic political dynamics, the chances are examined that Palestinian factions would be able to forge a broad-based, effective winning coalition, enabling it to reach a settlement that could create a Palestinian state peacefully coexisting with Israel, compared to other possible outcomes that fall short of that objective. The kinds of coalitions that could emerge determine the prospects for: achieving statehood, remaining mired in the unstable status quo, or some other outcome.

##### **04.08.02 Religion and Law: The Everlasting Battle between the Individual and Community**

**Pearce, Riley** *Northwestern State University*

There are several instances in which the topic of religion has created confusion with courts due to the conflicts between the rights of the individual and those belonging to the community as a whole. Specifically, religious rights in the workplace have been a struggle for those deciding whether or not the individual’s freedom trumps state and national laws. I will discuss a case where a citizen refused to serve same-sex couples as well as others relating to noncompliance in the workplace, where the citizens demanded protection of their stances because of the religious foundations. Of those cases, Kim Davis’ case will be the main focus. Title VII of the Civil Rights Act of 1964 and the Free Exercise Clause of the First Amendment will also be briefly discussed and analyzed in relation to the Kim Davis case. The obscurities will be reviewed along with the laws to draw conclusions for a potential ruling of this ongoing case. The research collected throughout the writing process suggests that there is no definite answer as to which side is “correct” or “fair” about the right of religious expression as justification for actions in the workplace; however, there are laws that prove interesting points of discussion that could potentially sway the public to either side of this controversy

#### **04.08.03 The Evolution of Abortion Law Statutes in Oklahoma**

**DeFilippo, Bailey** *Southwestern Oklahoma State University*

According to the Students for Life of America, by the year of 1860, there were factors that hindered abortion in as many as twenty of the United States. Some people may think issues with abortion are relatively new, but the truth is that this issue dates as far back as ancient days. In this presentation we will explore the evolution of abortion during a more modern time period in Oklahoma. Topics such as abortion laws, waiting periods, and psychological testing are only a few of the topics that are widely debated in this day and age. Through research, we will delve into these issues and learn how these and many more statutes are implemented into the abortion process in present-day Oklahoma. Only time will tell how these regulations will evolve; the question will always stand; pro life, or Pro Choice?

#### **04.08.05 Someone Poisoned the Water Hole: Water Quality in Disadvantaged Communities.**

**Hunter, Taylor** *East Central University*

**Cullum, Kaylin** *East Central University*

The purpose of this study is to determine whether or not impoverished citizens face health issues to a lesser degree than citizens from wealthier communities due to contaminated water sources. Also this study will look to determine the concentration of contamination in water supplies. These contaminants can be caused by various industries including agriculture and those that do hydrologic fracturing. The scope of this study will examine the southern United States specifically looking at cities with populations of 120,000 or less it and looks to determine the concentration of the toxins in the water supply used by the city.

#### **04.08.06 THE GREAT DEBATE: SHOULD GUNS BE ALLOWED ON COLLEGE CAMPUSES?"**

**Brown, Dan** *Southwestern Oklahoma State University*

THIS POSTER PRESENTATION WILL EXAMINE THE ISSUES RELATED TO THE POLICY PROPOSAL BY THE LEGISLATURE TO ALLOW GUNS ON OKLAHOMA COLLEGE CAMPUSES. RECENT INCIDENTS OF GUN VIOLENCE ON COLLEGE CAMPUSES IN THE UNITED STATES HAS CAUSED A PUBLIC DEBATE ON THIS ISSUE. THE PRESENTATION WILL ANALYZE THE ISSUE FROM A LEGAL STANDPOINT AND CONCLUDE WITH THE IMPACT PROPOSED POLICY ON OKLAHOMA COLLEGE AND UNIVERSITIES.

#### **04.08.07 Comparative Environmental Impact of Urban and Suburban Living**

**Savage,Caleb** *East Central University*

**DePre,Audery** *East Central University*

This project builds on existing research to compare the impact major American cities have on the environment to the impact of suburban and rural living on the environment. As the global population rises cities must design with a focus on its effect on the environment. Issues like resource consumption, the amount of "green space," and changes in temperature can negatively affect the environment and cities must work to address the issues. This project examines the comparative environmental impacts and discusses possible sustainability initiatives for both large and small cities to work against the potential issues facing a growing urban population.

#### **04.08.08 Personal Vs. Political: A Look at the Content of Twitter Usage by Members of the Oklahoma Legislature**

**Caldwell,Christopher Caldwell** *East Central University*

In this study I will look the usage of Twitter by members of the Oklahoma House and Senate and examine the content of their 'tweets' to determine whether or not they are more personal or political. Two objectives will be kept in mind while doing this, the first is to determine the nature of the 'personal' tweets to see if they are a result of causal usage of twitter or if they are designed to project a certain image. The second will be to see if the nature of personal vs. professional tweets varies based on age and gender. I hypothesize that while age will play a decisive role in the nature of said tweets (and twitter usage in general) gender will have little to no effect.

#### **04.08.09 The Case of Parks and Recreation: A Leslie Knope Effect?**

**Lasiter,Faith** *East Central University*

Local government does not get very much exposure in the American media. However, the television show "Parks and Recreation" which aired between 2009 and 2015 portrayed local government in an entertaining way. This paper follows in the footsteps of Feldman and Sigelman (1985) who analyzed the impact of the miniseries "The Day After." In this research I will use an experiment to test the effects of "Parks and Recreation." This experiment will be carried out on East Central University students enrolled in American Government. Two classes will be exposed to a clip of the show, and then be given a survey about local government opinions. Two classes will not be exposed to a clip of the show, but still given the same survey about local government to complete. I hypothesize that students who are shown a clip of "Parks and Recreation" will be more likely to associate positive views with local government, and will be more likely to consider careers in local government.

#### **04.08.10 DRIVING FACTORS OF COPRODUCTION IN PUBLIC SERVICE**

**Ho,Trung** *University of Central Oklahoma*

Even though coproduction has had a long history both in public administration literature and in practice, its conceptualization has really evolved to a new transformative level recently. Nevertheless, the empirical quantitative research to support coproduction understanding is limited in quantity. Contributing factors to enhance coproduction are interesting topics for deeper research. It is expected that when citizens exchange more information with public service agencies, engage more in politics and perceive strong self-efficacy, they will be more willing to contribute significantly to public service delivery, or in other words, to coproduce. Using the method of mail surveys, this research collects data from a sample of citizens in Oklahoma County in order to define the driving factors of coproduction among the citizens. The research output can confirm a previous similar research has been done in the Europe, but now in the context of the United States. It then contributes some insight for local policy makers as well as the academia in further developing coproduction as a tool for improving democracy.

#### **04.08.11 Age Does Matter: Twitter in the Oklahoma Legislature**

**Stafford,Lauren** *East Central University*

Social media has become another way for politicians to spread their message. With the increasing popularity of social media sites, such as Twitter, many members of the Oklahoma legislature have adopted these forms of social media. This research will analyze what members of the Oklahoma legislature are more likely to have a Twitter account. I will also be researching which members are more active on Twitter. The data will be collected during the months of January and February, 2016. I hypothesize that younger members of the Oklahoma legislature will be more likely to have adopted a Twitter. Further, I also hypothesize that younger members will also be more likely to actively use Twitter.

#### **04.08.12 Concealed Carry in Oklahoma, Cherokee County and NSU**

**Salmon,Thomas** *Northeastern State University*

**Salmon,Erika** *Northeastern State University*

OBJECTIVE. Concealed carry has surged nationwide since 2008. Our objective was to estimate the number of concealed carry licensees in Oklahoma, Cherokee County and NSU. METHODS. Using data from the Oklahoma State Bureau of Investigation, the US Census Bureau and NSU, we estimated the number of concealed carry licensees in Oklahoma, Cherokee County and among NSU full time faculty, administrators, staff and seniors, graduate and optometry students. RESULTS. The total number of concealed carry licensees in Oklahoma is about 230,000 and in Cherokee County 2,700, respectively 8.5% and 8.1% of the eligible population. The male/ female breakdown is 72%/ 28%. For NSU- Tahlequah, the estimated breakdown of concealed carry license holders is: Faculty 20; administrators 2; staff 34; seniors 149; graduate students 64; optometry students 9 (total 278). CONCLUSION. Concealed carry is more widespread than many realize. Concealed carry on campus is legal only with written permission of the university president, but storage in parked vehicles is permitted by law. If just 50% of licensees carry everyday, over 100 license holders may be legally storing guns in their vehicles daily on the Tahlequah campus. Lott showed that concealed carry licensees are exceptionally law abiding with less than one-sixth the conviction rate of police officers. The many responsible, trustworthy citizens with handgun permits at NSU are a potential asset and force multiplier for campus security.



#### **04.08.13 The Effect Social Media has on Tribal Elections.**

**Morris,Isaac** *East Central University*

The use of social media, particularly FaceBook, in Oklahoma state elections has been used to reach a broader constituency as well as make issues known to those constituencies. This research will analyze members of the Oklahoma House of Representatives use of FaceBook during campaigns. I hypothesize that non-tribal legislators are more likely to use FaceBook than tribal legislators.

#### **04.08.14 Tweet the People**

**Burl,Gavin** *East Central University*

Social media is proving its worth to the political world more and more every day. This research will track the amount of tweets sent from each House of Representatives and Senate member in the span of one month. I hypothesize that males on average, tweet more than females. I also hypothesize female members tweet to or in response to other accounts more often.

#### **04.08.15 The Effects of Urbanization and Youth on Politicians' Use of Social Media**

**Orr,Austin** *East Central University*

In modern times the new social medium for representatives to communicate with their constituency has moved to social media. This new method has allowed for representatives and constituents alike to personalize their communication with each other. This research will examine if there is a correlation between social media use of a representative and two demographical characteristics: urbanization and age. I hypothesize that the more urbanized a representative's constituency is the more likely they are to engage in social media. I further hypothesize that the younger a representative's constituency is the more likely they are to engage in the use of social media.

#### **04.08.16 Teaching Women in Politics in a Conservative State**

**Pappas,Christine** *East Central University*

Whether implicitly or explicitly, many Women in Politics textbooks assume a liberal stance toward teaching Women in Politics. The feminist agenda is basically the liberal agenda. There are issues such as abortion, gun control, and the role of women in society on which liberal and conservative women disagree. Therefore, a barrier to learning for conservative students is created in Women in Politics classes. This poster uses focus groups conducted in Oklahoma among Political Science students to generate suggestions for teaching Women in Politics to populations that include conservative students.

#### **04.08.17 Effects of Media Bias on Student Views toward Foreign Policy**

**Moseley,Elsa** *East Central University*

The media seems to play a major role in how students view the actions their government takes with or against another. What a politician says can have a significant impact on his or her image, while actions are viewed as less important (Baum and Groeling, 2009). How does media bias affect student views on foreign policy? I hypothesize that unbiased and biased topics may influence student views differently, and that the more knowledge a student possesses about a topic, the less likely it is he or she will be manipulated. My methodology will be to find out which media outlets are most popular among students by conducting an online survey. Next, I will use articles from those outlets featuring topics about relations between the United States and Russia. For the articles, I will utilize two categories: unbiased and biased (I will measure for bias by scanning each article for keywords leading to normative statements). The student population I sample will consist of general education classes (Introduction to Political Science, United States Government and History Survey) and upper level courses required only for Political Science and Legal Studies majors. Out of my samples, I will present the unbiased article to one portion of the total number of classes and the biased article to the other. After students read the articles, I will offer an in-class survey for rating their views on US and Russian foreign policy on a Likert Scale.

#### **04.08.18 Representatives Under Fire: Foreign Conflict and Approval of Democrats and Republicans in their First Terms of Office**

**Crawford,Wil** *East Central University*

During foreign conflict, the United States experiences a “rally around the flag” phenomenon. It is the aim of this project to determine how that phenomenon translates across party lines. It is hypothesized that Democratic representatives who experience foreign conflict during their first term of office will experience a decrease in in vote share in the following election cycle, while Republican representatives will experience an increase in vote share. Beginning with representatives elected before the 2001 invasion of Afghanistan and continuing through to the present, this project will examine the first-term vote share of representatives and contrast it with the vote share they received in their next election.

#### **04.08.19 Friending and Following: Oklahoma State Representatives and Senators' use of Facebook and Twitter**

**Hunter,Taylor** *East Central University*

As social media grows more popular and youth take more of an interest in politics, state representatives will use social media as a gateway to reach younger voters. The purpose of this study is to discover if social media is widely used, and, if it is, whether Twitter or Facebook is used more by members of Oklahoma's House and Senate. The second purpose of this study is to discover who runs the state legislators' Twitter or Facebook accounts: the representative or a staffer. The third purpose of the study will be to determine whether members of the Oklahoma House of Representatives or the Senate will be more likely to use social media. Discovering how modern state representatives communicate with their constituents will allow us to better understand how our representatives relate to the people that they serve.

#### **04.08.20 The 140-Character Soapbox: Legislative Processes and the Use of Social Media**

**West,Dylan** *East Central University*

In order to further evaluate and identify aspects of the effect of social media on legislators, I will conduct a case study to determine if there is any correlation between tweets sent by members of both houses of the Oklahoma Legislature and the time that bills were put to a vote. Using 20 randomly selected pieces of legislation that were either passed or struck down in April 2015, I will document all tweets posted by members of active Oklahoma legislators on the date each bill was either passed or struck down and I will then examine each specific tweet's content to determine if the subject matter either involves one of the 20 pieces of legislation or was tweeted near the time that one of the pieces of legislation was up for approval. I will then compile my findings and analyze the data to determine if there is evidence of strong, weak, or no correlation between tweets sent by Legislators and the timing of a bill being passed or struck down.

#### **04.08.21 Status Updates, Tweets, or Pictures: Does Age Determine How Oklahoma Legislators Communicate?**

**Williams,Emily** *East Central University*

With the reach of social media stretching into all aspects of American life, it is no surprise that the political culture of America is affected. To analyze the use of social media by politicians this study will focus on the members of the Oklahoma House of Representatives and Senate to determine whether or not age affects which social media outlet is used by the members. To complete this study data collection must be done on the ages of the Representatives and the profiles they have on Facebook, Twitter, and Instagram. The hypothesis is that the older members of the Oklahoma Legislature will be more likely to use Facebook than Twitter or Instagram. The results of this study will help voters decide if age is an important aspect of electability when considering their ability to communicate with their constituents.

#### **04.08.22 Campaign Appeals**

**Msovela,Nuru jacqueline** *East Central University*

Abstract: Do politicians accomplish all the work and promises they made during campaigns? this research will be about finding out if they do or do not fulfill their campaign appeals after they resume office and to what extent. The research will have sample questions on which will have 10 names of politicians or members who are in the House of Representatives from the 112th Congress elected in 2012. I will follow up their records after they were elected and in office to see how long they took to execute the campaign appeals, I shall also carry out a survey by asking some participants their views on the candidates. The research will be about finding the connection and validity between the campaign promises and legislative activities, the results will be very helpful to determine which political candidates are likely to get elected and who to give our votes to in the next coming election and choose good representatives.

#### **04.08.23 PTSD in Corrections: The Unspoken Reality Affecting Correctional Officers**

**Scheurer, Stacey** *Southwestern Oklahoma State University*

By the definition of Post-Traumatic Stress Disorder, also known as PTSD, any person can be exposed to a situation that can develop in to it. A correctional officer has a higher chance of developing PTSD than any other profession. This poster presentation will explain what PTSD is, what the symptoms are, and what a person with PTSD can experience. Also, it will address some of the reasons why a correctional officer can develop PTSD at a higher rate. Finally, this poster will address some of the options that a correctional officer has if he or she has PTSD.

#### **04.08.24 Greener Construction For Smoother Living**

**Stevenson, Justin** *East Central University*

**Pittman, Ian** *East Central University*

In this poster we plan to explore the use of sustainable construction methods, (green construction) and if the benefits outweigh the costs. This area has become more and more prevalent as resources begin to deplete; it seems beneficial to research if green construction is truly a cost effective means of future building. The objective of this presentation is to analyze the cost of these methods versus the benefits. We will look at how these methods are applied to new construction projects as well as the retrofitting of older buildings and homes. The research will also show whether these methods can be sustained throughout time or not. By using existing resources and publications on the subject we will ascertain if the method is currently beneficial; also if it will stay beneficial in the future. We will determine if the methods currently being used will have to be modified going forward due to lack of materials or if the current resources can sustain this cause.

#### **04.08.25 Follow Me For More Tweets**

**Stevenson, Justin** *East Central University*

**Henry, Chisum** *East Central University*

The object of this study is to discover the correlation between the amount of followers the members of the Oklahoma House of Representatives and Senate have and how often they tweet. Our assumption is that the more followers one has, the more they will post. The importance of this study would show us how valuable having followers is. This will also show us if a person tweets more often, they will gain followers. The power of social media is incredible. I did a project a year ago that consisted of seeing how many retweets my tweet would receive in a 24 hour period. I started out with 360 followers and within the 24 hour period I ended with 2,300 followers and 106,000 retweets. I had responses from all around the world. Imagine the impact someone has when they already have millions of followers. Their tweets come often and we will study how often they come and how many followers they possess.

#### **04.08.26 Your DNA in Politics: Do a Person's Personality Traits Determine Political Affiliation?**

**Riddle,Skylar** *East Central University*

My goal is to study and determine the correlation between a person's personality traits and political affiliation. The personality traits that I am using are the personality traits that C. Jung, and The Myers-Briggs Foundation created. The personality traits that they have created includes extrovert, introvert, sensing, intuition, thinking, and feeling. In my research I define each of those terms. The political affiliations that I am using Republican, Democrat, Independent, no political party, liberal, conservative, and moderate. I believe that many political scientists, registered voters, people interested in politics, people who are trying to determine which political affiliation, and psychologists will find this study extremely interesting. After securing IRB approval, I created a personalized version of the C. Jung, and The Myers-Briggs Foundation questionnaire, and added political questions. This questionnaire was given in both electronic and hard copy versions.

#### **04.08.27 Housing and Employment for Transitioning Foster Youth**

**Mitchell,Deja** *University of Central Oklahoma*

Youth aging out of foster care in Oklahoma are severely hindered from achieving self-sufficiency due to a number of social and economic issues affecting the boomerang generation of contemporary American society. Older foster youth are more likely to encounter issues with homelessness and unemployment, and are less inclined to obtain post-secondary education opportunities than non-foster youth. In order to produce concrete recommendations for child welfare policy reform in the state, this essay will present a policy analysis of the Foster Care Independence Act and evaluate Lighthouse Youth Services' Life Skills & Housing Options for Young Adults 17-24 Program in Hamilton, Ohio as a housing-based, independent living model. My hypothesis is stable housing increases the likelihood of stable employment among former foster youth ages 18 to 26. The research methodology for this essay mainly consists of qualitative and quantitative research collected from primary and secondary sources. The researchers of this study utilized several measurement tools for data collection that included surveying and interviewing study participants. A strong correlation was found to exist between stable housing and employment among transitioning youth in Oklahoma. Thus, stakeholders benefiting foster youth must prioritize housing-based interventions for child welfare reform to improve foster youth outcomes in Oklahoma.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **04. Liberal Arts**

#### **09. Sociology**

##### **04.09.01 Life in Oklahoma as an Exchange Student**

**Jeong,E.K.** *Southwestern Oklahoma State University*

**Lee,Jeongmin** *Southwestern Oklahoma State University*

**Kim,Heeeun** *Southwestern Oklahoma State University*

This research concerns the experiences of university students from South Korea as exchange students at SWOSU for a year. After spending some time as exchange students in Oklahoma, these students realized some important differences between life in Weatherford, Oklahoma and life in Busan, Korea. The research team decided to analyze and share their observations regarding everyday details that affect the exchange-student experience. Using qualitative research methodology with data collected in journals and photos, this study focuses upon what these students have discovered during one year as foreign national college students, particularly in three categories: school life, cultural challenges, and language challenges. Although this research is based on the experiences of exchange students from Korea in Oklahoma, its generalizable knowledge can be useful for students, faculty, administrators, as well as members of communities that host foreign exchange students. The researchers hope that this study helps colleges and universities to expand their programs globally.

#### **04.09.02 Improving Responses for Drug Endangered Children from the Mouths of Babes**

**Shukla,Rashi** *University of Central Oklahoma*

**Maier,Elizabeth** *University of Central Oklahoma*

**Bell,Kathy** *Other*

**Newton,David** *University of Central Oklahoma*

Drug endangered children (DEC) are amongst the most vulnerable victims of the drug problem. They are often overlooked in policy responses and criminological research. While there is a growing body of research documenting the impact of drug exposure and associated risks, less is known about children's perceptions of their situations and how best to respond. This study uses forensic observation data from children following removal from a drug home to understand how to improve policies and responses. Secondary medical observation data from over 150 children removed from methamphetamine homes between 2001 and 2015 were examined. Children were at risk of trauma due to criminal and drug-related activities in the home, separation from caregivers, and experiences during police encounters. There is a need to develop stronger policies and practices in the following areas: exposure to the hazards of drug manufacturing, minimize the influence of drug activity and knowledge, enhance short- and long-term health and well-being, and minimize negative police encounters. An overview of the types of policies that are warranted will be presented.

#### **04.09.03 The Methodological Challenges of Studying the Global Methamphetamine Problem**

**Shukla,Rashi** *University of Central Oklahoma*

**Magness,Matt** *University of Central Oklahoma*

**Stoneberg,Danielle** *University of Central Oklahoma*

Increases in technology and communications that have accompanied globalization facilitate the abilities of criminal groups and networks at various levels to engage in illicit activities. In response to control efforts, offenders continually revisit methods of doing business and develop strategies aimed at evading detection. The difficulties inherent in tracking and monitoring ever-changing illicit activities continue to grow in the global environment. This research reviews the challenges associated with studying global crime problems by focusing on the case of methamphetamine production and trafficking. Data from numerous secondary sources were reviewed. Methamphetamine is increasingly becoming an issue in regions around the world. However, serious data limitations restrict efforts to study this problem from a multinational perspective. Through the ongoing evolution and adaption of their behaviors, offenders often managing to stay a step ahead of efforts to track and enforce their illicit activities. The implications of data limitations for monitoring such global illicit activities and the on-going adaptations of offenders will be presented.

#### **04.09.04 The effects of school bullying, and social support on stress among Asian adoptees in trans-racial families**

**Bang,Eun-Jun** *Northeastern State University*

**Shahan,,Kathlyn** *Northeastern State University*

Although there are numerous research studies on post adoption services to improve the wellbeing of adopted children and their adoptive families, there is scarce research on school adjustment of adopted children. To address this gap, the current study examined the link between the experience of school bullying and psychological stress among Asian children adopted into U.S. adoptive families. In addition, it examined the role of social support in moderation of the association between the experience of being bullied and stress. One hundred sixty one questionnaire packets were mailed and 31 (19%) were completed. Participants were male (n=10) and female (n=21) students ranging from 9-16 years old (M=13, SD=1.61). Data analysis utilizing the independent t-test and ANOVA indicated that peer intervention [ $t(29) = 4.52, p < .001$ ] and adult or teacher intervention [ $F(2,28) = 8.795, p < .001$ ] could be a moderating factor to lower stress levels among Asian adoptees. The findings indicate that there is a positive relationship between teacher or peer support of intervening in a bullying situation by reducing the stress level within the Asian adoptee being bullied. The findings provide further validation of the need of intervention programs and/or training to educate teachers and students to prevent bullying issues among Asian adoptees in trans-racial families.



## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **02. Animal Science**

##### **05.02.01 Multi-Scale Straightness Index Analysis of Goat Behavior**

**Goetsch,Arthur** *Langston University*

**Gipson,Terry** *Langston University*

**Andries,Kenneth** *Other*

**Hutchens,Terry** *Other*

**Evans,Myron** *Other*

Multi-scale straightness index (MSSI) has been proposed for determining behavioral states in wildlife. The objective of this study was to apply MSSI to grazing goats. 13 mature Boer-cross females were fitted with GPS collars that recorded a fix every 5 min for 3 days. The study area was a 40-ha unimproved hill pasture. Only fixes within a boundary and buffer shape-files were used to calculate MSSI using granularity (g) from 1 to 12 and window (w) from 1 to 36 with the constraint that w/g must be an integer. Within daytime (D) and nighttime (N) periods, MSSI were calculated for each g-w combination. A linear-linear-linear grafted polynomial analysis was conducted to ascertain ridge points for g-w combinations. The first linear segment before the first break point for both D and N was always when  $g = w$  for a g/w ratio of 1 and accounted for 11% of the MSSI. The last linear segment representing highly tortuous travel, most probably grazing or resting, was 81 and 85% of the MSSI with an average MSSI of  $0.17 \pm 0.083$  and  $0.08 \pm 0.050$  for D and N, respectively. The middle linear segment, representing targeted travel, accounted for 8 and 4% of the MSSI with an average MSSI of  $0.53 \pm 0.108$  and  $0.41 \pm 0.119$  for D and N, respectively. For targeted travel, g averaged 1 for both D and N and w averaged 5 and 3 for D and N, respectively. Even in a herd of goats familiar with the terrain, targeted travel account for a small percentage of behavior and was only for

## **05.02.02 Effects of Restricted Diet Access on Intake and Performance by Dairy Goats in Mid- to Late Lactation**

**Goetsch,Arthur** *Langston University*

**Silva,Nhayandra** *Langston University*

**Gipson,Terry** *Langston University*

**Tsukahara,Yoko** *Langston University*

**Sahlu,Tilahun** *Langston University*

Restricting dietary access of lactating dairy goats could influence level or efficiency of production and offer different management options. Therefore, objectives were to determine effects of offering feed at different times and for various lengths on intake and milk yield and composition of 50 Alpines (125 days-in-milk). A 40% forage diet was given free-choice in Calan gate feeders during a 12-wk experiment. Treatments were feed access continuously (C), during the day for 8 h (D) or night for 16 h (N), and for 2 or 4 h/d with equal lengths after milking in the morning and afternoon (2H and 4H, respectively). Neither dry matter intake (DMI) (2.05, 1.87, 2.08, 1.91, and 1.87 kg/d) nor milk yield (1.77, 1.75, 1.67, 1.64, and 1.68 kg/d for C, D, N, 2H, and 4H, respectively) were influenced by treatment ( $P>0.05$ ), with milk yield (1.83, 1.84, 1.60, and 1.54 kg/d in periods 1, 2, 3, and 4, respectively) but not DMI differing among periods. Treatment also did not influence average daily gain (32, 22, 49, 9, and 20 g). Energy-corrected milk (3.5% fat, 3.2% protein) in kg/d (1.70, 1.66, 1.58, 1.53, and 1.52 kg/d) and relative to DMI (0.79, 0.84, 0.78, 0.81, and 0.81 kg/kg for C, D, N, 2H, and 4H, respectively) were similar among treatments. In conclusion, dairy goats in mid- and late lactation possess considerable flexibility in eating behavior that may allow for incorporation of limited feed access regimes in management systems for most efficient facility utilization.

### **05.02.03 Effects of High Heat Load on Body Weight, Dry Matter Intake, Rectal Temperature, and Respiration Rate of Katahdin Sheep and Boer and Spanish Goat Wethers**

**Goetsch,Arthur** *Langston University*

**Urge,Mengistu** *Langston University*

**Puchala,Richard** *Langston University*

**Gipson,Terry** *Langston University*

**Sahlu,Tilahun** *Langston University*

Yearling Katahdin sheep (K) and Boer (B) and Spanish (S) goat wethers were used to determine conditions to evaluate differences in resilience to high heat load index (HLI). Target HLI were 70, 80, 90, 95, and 100 during day and 70, 70, 77, 81, and 85 at night in periods 1 (3 wk) and 2 to 5 (each 1 wk). Actual values averaged 66, 80, 92, 97, and 101 during daytime and 66, 75, 84, 86, and 89 at night in periods 1-5, respectively. Hay intake was generally similar to the baseline (95.0, 72.4, 93.6, and 96.4% in periods 2-5, respectively). Rectal temperature at 0600, 1300, and 1700 h was lowest for Katahdin in periods 3 (39.4, 39.2, and 39.6°C) and 4 (39.9, 39.6, and 40.0°C for Boer, Katahdin, and Spanish, respectively). There was an interaction in respiration rate between animal type and period (71, 105, and 105 in period 2, 93, 101, and 104 in period 3, 121, 139, and 129 in period 4, and 105, 126, and 109 breaths/min in period 5 for B, K, and S, respectively). Rectal temperature and respiration rate were much lower at 0600 (38.7, 38.9, and 38.8°C and 34, 77, and 56 breaths/min) than at 1300 (39.7, 39.6, and 39.9°C and 127, 137, and 135 breaths/min) and 1700 h (40.1, 39.7, and 40.2°C, and 131, 139, and 144 breaths/min for B, K, and S, respectively). In conclusion, K generally exhibited greater ability than B and S to increase respiration rate and minimize rectal temperature at high HLI and periods longer than 1 wk are required for evaluating variables su

#### **05.02.04 Effects of Two Heart Rate-Based Methods of Estimating the Grazing Activity Energy Cost of Boer Goat Wethers**

**Goetsch,Arthur** *Langston University*

**Brassard,Marie** *Langston University*

**Puchala,Richard** *Langston University*

**Gipson,Terry** *Langston University*

**Sahlu,Tilahun** *Langston University*

Methods of estimating the grazing activity energy cost (GAEC) of ruminants were compared. Boer goat wethers consumed Sudangrass while grazing a 0.8-ha pasture or confined. Heart rate (HR) measured over 24 h in 5-min intervals and the ratio of heat energy (HE) to HR for each animal with a stationary calorimetry system for 24 h while consuming grass hay was used to estimate HE. A GPS collar and leg activity monitor were used when HR was measured to determine HE when resting-lying (L), resting-standing (S), grazing (G), and walking (W); behavior in confinement was L or S. The grazing activity method (GAM) was based on time in different activities multiplied by corresponding HE, with GAEC the sum of differences between S, G, and W relative to L. The confinement method (COM) entailed subtracting total HE while confined from that when grazing. There were differences ( $P<0.01$ ) in % of the day spent in the 4 activities (34, 54, 11, and 1%) and the associated daily HE (241, 322, 75, and 6 kJ/kg BW<sup>0.75</sup>). Total daily HE (642 and 482 kJ/kg BW<sup>0.75</sup>) and HE while lying (598 and 450 kJ/kg BW<sup>0.75</sup>) were greater when grazing than confined ( $P<0.01$ ). Daily GAEC was greater ( $P<0.01$ ) for COM vs. GAM expressed in kJ/kg BW<sup>0.75</sup> (165 and 46) and relative to HE when confined for COM and of L on a daily basis for GAM (35 and 8%). In conclusion, method of estimation can have substantial impact on GAEC. Greater L HE per unit time when grazing than confined may contribute to lower GAEC for GAM than for COM.

#### **05.02.05 Determination of the Grazing Activity Energy Cost in Boer Goat Wethers Using a Portable Indirect Calorimetry System**

**Goetsch,Arthur** *Langston University*

**Brassard,Marie** *Langston University*

**Puchala,Richard** *Langston University*

**Sahlu,Tilahun** *Langston University*

Heat energy (HE) of small ruminants in free-moving settings is often measured from heart rate (HR) and HE:HR determined in a stationary calorimetry system. Therefore, feasibility of use of a portable indirect calorimetry system with goats while grazing was investigated. Ten yearling Boer goat wethers were used to determine HE and the grazing activity energy cost (GAEC) while standing or grazing Sudangrass pasture with a portable indirect calorimetry system. The method entailed use of a partial face mask that allowed unrestricted grazing to measure oxygen consumption and carbon dioxide emission for 30 min while restrained in a stanchion, followed by 60 min of grazing. The face mask was attached to a 15-m tether along with a corrugated plastic hose through which exhaled air was passed to portable calorimetry system carried by a researcher. Measurement periods were during morning and afternoon grazing bouts. HE while restrained was 18.7 kJ/kg BW<sup>0.75</sup>/h. Grazing HE increased to 35.1 kJ/kg BW<sup>0.75</sup>/h, implying that the GAEC was 16.4 kJ/kg BW<sup>0.75</sup>/h. Goats spent 8.5 h/d grazing; therefore, the daily GAEC was  $138 \pm 17.3$  kJ/kg BW<sup>0.75</sup>. Similar GAEC ( $165 \pm 10.4$  kJ/kg BW<sup>0.75</sup>/d) was determined from the difference in HE estimated from HR between times when grazing a 0.8-ha pasture and confined in nearby  $1.2 \times 1.2$  m pens and fed fresh forage. In conclusion, this method offers promise for relatively simple and direct estimates of the sizable fraction of total HE comprised by GAEC

## **05.02.06 Effects of Mixing Different Breeds to Evaluate Electric Fence Strand Additions to Barbed Wire Fence to Contain Growing Meat Goat Kids**

**Goetsch,Arthur** *Langston University*

**Tsukahara,Yoko** *Langston University*

**Gipson,Terry** *Langston University*

**Hayes,Jerry** *Langston University*

**Puchala,Richard** *Langston University*

**Sahlu,Tilahun** *Langston University*

A method of evaluating electric fence strand addition to cattle barbed wire fence for goat containment would be useful to promote co-grazing. Therefore, 79 Boer (B) and 80 Spanish (S) growing goats were used to evaluate effects of grouping, single breed (SGL) and breeds combined (COM), on behavior when exposed to barbed wire fence with different electric strand additions. Evaluation pens had 1 side of barbed wire strands at 30, 56, 81, 107, and 132 cm from the ground. Fence treatments (FT) were electrified strands (6 kV) at 15 and 43 (LH), 15 and 23 (LM), 15 (L), 23 (M), and 43 cm (H). For adaptation, kids were exposed in evaluation pens to no electric strands (NES), NES, LH at 0 kV, LH at 6 kV, and NES in wk 1, 2, 3, 4, and 5, respectively. Then kids were divided into 2 replication sets per grouping (2 B-SGL, 2 S-SGL, 2 B-COM, and 2 S-COM). There were no main effects of grouping. Fence treatment affected ( $P<0.01$ ) animals receiving a shock (59, 45, 34, 23, and 6%), exiting with shock (38, 36, 31, 20, and 3%), and exiting without shock (0, 15, 50, 68, and 76% for LH, LM, L, M, H, respectively). There was an interaction ( $P=0.01$ ) between FT and grouping in pen exit (50, 25, 75, 86, and 43% with B-COM, 13, 78, 88, 75, and 100% with B-SGL, 63, 63, 75, 88, and 75% with S-COM, and 25, 38, 88, 100, and 100% with S-SGL for LH, LM, L, M, and H, respectively). In conclusion, either method of grouping appeared appropriate to evaluate electric strand additions to barb wire fence.

**05.02.07 Effects of Breed and Resistance Classification of Sire on Progeny Growth Performance and Response to Artificial Infection with *Haemonchus contortus* in a Central Performance Test**

**Goetsch,Arthur** *Langston University*

**Tsukahara,Yoko** *Langston University*

**Gipson,Terry** *Langston University*

**Hart,Steve** *Langston University*

**Dawson,Lionel** *Oklahoma State University*

**Wang,Zaisen** *Langston University*

**Puchala,Richard** *Langston University*

**Sahlu,Tilahun** *Langston University*

Fifteen Dorper (D), 14 St. Croix (C), 14 Kiko (K), 13 Boer (B), and 17 Spanish (S) males were used to investigate effects of classification for resistance to *H. contortus* of sire and among and within breed differences in the second year of a central test for growth and response to artificial infection with infective larvae. In the first year, males were randomly selected from 6 herds/flocks. Animals used in this study were progeny of the sires (i.e., High and Moderate, with no progeny of susceptible males) selected in the first year. The test entailed an adjustment period of 2 wk followed by 8 wk of data collection. During adaptation, anthelmintic treatment resulted in low fecal egg count (FEC; < 600/g), after which 10,000 larvae were administered orally. Breed affected ( $P \leq 0.01$ ) average daily gain (ADG) (307, 286, 159, 247, and 142 g), dry matter intake (DMI) (2.2, 1.6, 1.3, 1.5, and 1.3 kg), FEC (2,098, 1,278, 1,419, 1,335, and 716 eggs/g, original scale), and packed cell volume (27.2, 31.7, 31.6, 28.1, and 25.6% for D, C, K, B, and S, respectively). Means of resistance classification of sires were similar for FEC, PCV, ADG, and DMI. Correlation coefficients of sire and progeny FEC within breed were nonsignificant. In conclusion, with only one generation of selection, there was no detectable relationship in resistance to internal parasite between selected sires and progeny based on FEC after an artificial challenge.

## **05.02.08 Growth Performance and Resistance to Internal Parasitism of Small Ruminant Males from the South-Central US in a Centralized Test**

**Goetsch,Arthur** *Langston University*

**Tsukahara,Yoko** *Langston University*

**Gipson,Terry** *Langston University*

**Hart,Steve** *Langston University*

**Dawson,Lionel** *Oklahoma State University*

**Wang,Zaisen** *Langston University*

**Puchala,Richard** *Langston University*

**Sahlu,Tilahun** *Langston University*

Young male sheep and goats from farms in AR, KS, MO, and OK were used in a centralized test, which included artificial infection with *Haemonchus contortus*, to investigate growth and resistance to internal parasitism. Year 1 included 2 Katahdin flocks (KS-A, n = 17g; KS-B, 18), 20 Dorper (DS), 13 St. Croix (CS), 2 Boer herds (BG-A, 16; BG-B, 17) 16 Kiko (KG), and 14 Spanish (SG). In yr 2, animals were progeny from breeding groups classified in yr 1 as of high and moderate resistance. There was 2 wk for adaptation and an 8-wk test period, with automated feeders allowing free-choice diet access. During adaptation, anthelmintic treatment resulted in low fecal egg count (FEC; < 600/g), after which 10,000 infective larvae were administered orally. Breed affected ( $P \leq 0.01$ ) FEC in yr 1 (1,512, 2,196, 3,072, 1,229, 1,069, 2,713, 3,575, and 1,182 eggs/g for KS-A, KS-B, DS, CS, BG-A, BG-B, KG, and SG, respectively) and yr 2 (2,621, 1,368, 1,413, 1,669, and 884 eggs/g for DS, CS, BG-A, KG, and SG, respectively). Animals were placed in 3 categories of resistance (i.e., high, moderate, low) within flocks/herds based primarily on FEC but also considering residual feed intake and average daily gain (ADG). Resistance category means were similar ( $P > 0.05$ ) for ADG and gain:feed in both years. In conclusion, based on FEC after an artificial challenge in a standardized environment, there was considerable variability among flocks/herds of small ruminants in resistance to internal parasitism.

## **05.02.09 Determination of Unknown Species of Sorex From Western North Dakota Using Cranial Morphometric Analysis**

**Shaughnessy,Michael** *Northeastern State University*

**Williams,Anna** *Northeastern State University*

Small mammals were trapped in western North Dakota during 2014 and 2015 summer field seasons. Collected specimens were preserved according to standardized museum protocols and installed in Northeastern State's Museum of Natural History. Among the 1091 collected small mammals, shrews composed 119 total specimens. Of these, 26 specimens in the genus *Sorex*, could not be identified in the field to species. Previous research conducted on skull morphology of *Sorex* specimens has shown that measurements of both the palatal length and breadth have been successfully used to identify. Our goal was to identify, using palatal breadth and length of skulls the species designation of the 26 unknowns *Sorex*. We plotted these data from the 26 unknown species against known palatal lengths and breadths of both *S. haydeni* and *S. merriami* from western North Dakota. By comparing our unknown measurements to known measurements of both species, we were able to successfully identify all 26 unknown species as *S. haydeni*.

## **05.02.10 Evaluation of Ehrlichiosis Affecting Canines in Northeastern Oklahoma**

**Corley,Jodi** *Northeastern State University*

**Kirk,Dianne** *Northeastern State University*

**Ruskoski,Sallie** *Northeastern State University*

Ehrlichia species can be found in ticks and are concerning because they can cause world-wide ehrlichiosis in humans and other mammals. The primary vector for the bacteria is the lone star tick. Ehrlichia spp. reproduce in mammalian leukocytes. In ticks, organisms remain dormant in the salivary glands until transferred to secondary hosts, such as humans and canines, during feeding. The purpose of this study was to evaluate canines in Northeast Oklahoma with symptoms of tick-borne disease, such as lethargy, anorexia, fever, and depression for exposure to Ehrlichia spp. Between September 2014 and September 2015, samples from 51 symptomatic canines were obtained from local veterinary hospitals. Sera were screened for antibodies to Ehrlichia spp. using an indirect immunofluorescent antibody assay (IFA). This testing revealed that 33 (65%) canines had positive titers to Ehrlichia spp. DNA was extracted from EDTA-treated whole blood from the positive IFA samples and end-point polymerase chain reaction (PCR) was employed to confirm the presence of the organism. PCR confirmed the presence of Ehrlichia spp. DNA in 17 (52%) samples while 16 (48%) were negative. These data support the conclusion that while symptomatic canines may test positive for antibodies to Ehrlichia spp., it does not necessarily indicate a current infection with the organism.

## **05.02.11 Use of Species Specific Interferons in Veterinary Medicine**

**Trubitsyn,Denis** *Southwestern Oklahoma State University*

**Peetoom,Jaci** *Southeastern Oklahoma State University*

**Kimble,Shane** *Other*

Interferons are cytokines, a type of signaling proteins involved in immune response that are released by affected cells in situations such as the invasion of viruses, bacteria, or parasites. Currently, human recombinant interferons are used in veterinary medicine to treat various conditions in animals; however, interferons are species specific and human interferon based drugs require higher dosages administered to animals to achieve remission. The purpose of this study is to determine how well species specific interferon medication works in improving health of domestic animals suffering from various conditions. Pharmaceutical substances based on recombinant bovine, swine, canine, equine interferons with or without an antibiotic will be administered to animals suffering from low immune response levels, viral and bacterial infections, stress, etc. In order to collect data for analysis veterinarians will examine the condition of animals subjected to study followed by completion of a questionnaire by animal owners. The use of species specific interferons will be analyzed to test the prediction that these pharmaceutical substances are more beneficial when compared to human interferon that are currently administered.



## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **03. Biology**

##### **05.03.01 Development of a prototype microfluidic paper based analytical device based on a lateral flow assay format for the detection of disease antibodies in blood plasma.**

**Bowen,John** *University of Central Oklahoma*

**Tappert,Mary** *University of Central Oklahoma*

**Jarshaw,Jane** *University of Central Oklahoma*

A prototype method for the detection of viral antibodies in blood plasma using a low volume microfluidic paper based analytical device based on a lateral flow assay was developed. This will be used as a prototype for the detection of antibodies Blue Tongue Virus and Epizootic hemorrhagic disease virus.

##### **05.03.02 Construction of rat chronic unpredictable mild stress animal model**

**Wu,Ning** *Southeastern Oklahoma State University*

**Love,Casey** *Southeastern Oklahoma State University*

**Sharp,Patrick** *Southeastern Oklahoma State University*

**Golden,Teresa** *Southeastern Oklahoma State University*

The major depressive disorder (MDD) accounts for 40.5% of mental and substance use disorders with a higher global burden than that of any other disease. The understanding of the nature and causes of MDD has evolved over the centuries, but the precise pathophysiological mechanisms are still not clear. It has been known that MDD affects multiple systems with various clinical manifestations, which also involve multiple gene functional abnormalities. Our past clinical and cell biology studies have also confirmed multi-gene involvement in MDD and stress related hypothalamic-pituitary-adrenal axis hormonal dysfunction. However, it is still impossible to elucidate a complete picture of MDD mechanisms because each individual study only covers the partial mechanism of MDD and those in vitro experiments may not completely reflect the reality of internal environmental changes. It is urgent to establish an effective and reliable animal model for future MDD studies in vivo. Although there have been a large number of experiments tested dealing with animal depression model, only a small few can be credited as useful MDD research tools mainly due to the unstable results of such animal model construction. The purpose of this study is to conclude an experimental confirmed, effective technique to develop chronic unpredictable mild stress (CUMS) animal model by using rat as the experimental target to facilitate future studies in MDD mechanisms and antidepressant drug development.

### **05.03.03 Is It Worth the Risk? 12-Hour Shifts and Nursing Fatigue**

**RICHARDS,AMY** *Other*

**Barwari,Ronak** *Other*

**Weathers,Danna** *Other*

**Reith,Vicky** *Other*

Is It Worth The Risk? 12 Hour Shifts and Nurse Fatigue The nursing shortage in the 1970s and 1980s brought about changes in staffing patterns including the incorporation of 12 hour shifts. This trend continues as employers find 12 hour shifts more cost effective, decrease handoff errors and increase continuity of patient care. Some nurses prefer 12 hour shifts because they are able to work fewer days per week decreasing travel time and childcare costs. They enjoy more work-life balance and have the opportunity to seek additional employment on their days off. Proponents of 12 hour shifts argue that 12 hour shifts lead to consistency and continuity of care because there is a reduction from three hand-offs to two hand-offs between nurses every 24 hours. Less hand-offs may also decrease the incidence of errors and sentinel events. Stone et al. (2006) found that 12 hour shifts led to greater job satisfaction, less absenteeism, and decreased turnover rates in staff. Medication errors, patient falls, and the incidence of decubitus ulcers measure of quality were similar in all shift lengths. Despite the advantages of 12 hour shifts, concern has been expressed about nurses' health and patient safety when nurses work for long periods of time.

### **05.03.04 3,4',5- Trismethoxybenzophenone inhibits the growth of human hepatocarcinoma cells via cell-cycle arrest at the G2/M phase.**

**Patton,Christopher** *University of Central Oklahoma*

**Kotturi,Hari** *University of Central Oklahoma*

**Khadka,Pritika** *University of Central Oklahoma*

3,4',5-trismethoxybenzophenone (TMBP) is an analogue of the natural dietary polyphenolic compound resveratrol (RVT). RVT and its analogues have also been shown to prevent hepatic steatosis. In this study we focused on TMBP, which is a methylated derivative of RVT. Studies have shown that TMBP exhibits added biological effects and a better pharmacokinetic profile compared to RVT due to the presence of methoxy groups. The human hepatoma cell line (FCA4 cells) that harbors a subgenomic selectable HCV replicon was used for this study. The Huh 7 cell line lacking the replicon served as the corresponding control. MTS assay was used to determine the cytotoxicity of TMBP at various concentrations. Wound healing assay was performed to determine the effect of the analogue on cell migration. Flow cytometry and magnetic levitation were used to measure the effect of compound on cell cycle and 3D spheroid formation. Our data showed that treating liver cancer cells with TMBP resulted in a significant dose and time dependent growth inhibition combined with G2/M-phase cell cycle arrest at 5  $\mu$ M (IC50 at 7.5  $\mu$ M). TMBP at 5  $\mu$ M inhibited the formation of 3D spheroids, and also repressed the migration of cancer cells. Therapies currently used for treating hepatocellular carcinoma (HCC) have a high incidence of recurrence and postoperative death in patients. Our studies show that we have identified a promising analogue for treating HCC.

### **05.03.05 The Effect of Gravitational Forces, Experienced at a Space Shuttle Launch, on the Reproduction and Behavior of *Caenorhabditis elegans***

**Hmeluk, Natalie** *Tulsa Community College*

**Wyatt, Kimberley** *Tulsa Community College*

In this study, we simulated space shuttle launch of the nematode, *Caenorhabditis elegans*, in a lab and observed how gravitational forces affected its reproduction and behavior. After calculating revolutions per minute to the G-forces of 3 and 2, we modified a Wafer Spinner into a centrifuge and exposed the nematodes to the G-forces. Following this, we observed the nematodes over the course of two generations. We expect the results to give us a better understanding of the effect space flight has on the human body. We hypothesize that if *C. elegans* is exposed to G-forces of 3 and 2, the reproduction rate will be lower, due to the stress of spaceflight, and the behavior of *C. elegans* will differ from the *C. elegans* not exposed to G-forces of 3 and 2.

### **05.03.06 Evaluation of Voltages Produced from Solar Cells Produced from Chloroplast Isolations from Four Plant Phyla**

**Bidlack, James** *University of Central Oklahoma*

**Antonyukov, Sergey** *University of Central Oklahoma*

**Graves, David** *University of Central Oklahoma*

**Tatum, Baylee** *University of Central Oklahoma*

**Zajac-McConaghy, Winifred** *University of Central Oklahoma*

**Murphy, Erinn** *University of Central Oklahoma*

**Sutter, Ben** *University of Central Oklahoma*

Data were evaluated from ongoing experiments to find a plant substance which is suitable for the manufacture of practical dye-sensitized photovoltaic cells (DSSCs). Representative samples of Bryophyta, Polypodiophyta, Pinophyta, and Magnoliophyta were obtained from a local store (Home Depot) or park (Arcadia Lake, Oklahoma), subjected to the chloroplast isolation techniques, incorporated into DSSCs, and monitored for voltage production over a period of 30 days. Results indicated that, when averaged across species, voltages produced by DSSCs using crude and manufactured TiO<sub>2</sub> coatings were not significantly different, although there were occasional differences in voltage production for certain species when different coating strategies were used. Interestingly, the fern produced the highest peak and average voltages in crude DSSCs, whereas the pine produced the highest and peak average voltages in manufactured DSSCs. Hence, the most exciting finding from this new investigation is that chloroplasts from different plant species produce different voltages, and these differences also rely upon the coating strategy for the applying TiO<sub>2</sub> to the DSSCs. Specifically, fern achieved a peak of 324.5 mV in crude DSSCs and pine achieved a peak of 233.5 mV in manufactured DSSCs. We are very enthused to have met or exceeded a peak of 230 mV for chlorophyll from spinach in previous work.

## **05.03.07 Use of Jasmonic Acid and Salicylic Acid to Control Harmful Nematodes in Soybeans**

**Bidlack,James** *University of Central Oklahoma*

**Zajac-McConaghy,Winifred** *University of Central Oklahoma*

**Faw,Joshua** *University of Central Oklahoma*

**Taher,Ibrahim** *Other*

**Metts,Michalea** *University of Central Oklahoma*

**Jarshaw,Jane** *University of Central Oklahoma*

**Littlefield,Michelle** *University of Central Oklahoma*

**Osburn,Felicia** *University of Central Oklahoma*

**Drescher,Laurelyn** *University of Central Oklahoma*

This experiment was conducted to determine if jasmonic acid (JA), salicylic acid (SA), or a combination of both treatments would alter the biomass of soybeans in the absence and presence of harmful nematodes. Plants were established in pots on the roof of UCO's Science Building and nematodes were introduced a few weeks after establishment. Two experiments were conducted, one with introduction of nematode eggs and another with infestation by juvenile nematodes. In each experiment, the three chemical treatments were sprayed on plants shortly after nematodes were introduced. Half of the plants were harvested at mid-season and the rest of the plants were harvested at maturity. Measurements were taken to determine plant height, fresh and dry weight of all plant components, as well as number of nematodes present for each treatment. Nematode counts in both experiments were highly variable and, by the end of the experiment, nematodes were observed in all treatments, even if no eggs or juveniles were added to individual pots. Hence, the focus of the experiment was directed towards effect of chemical treatments on plant measurements, and, where possible, whether or not chemical treatments significantly affected nematode count. In general, SA increased the weight of some soybean plant components in both the nematode infected and non-infected treatments. The JA treatment, as well as treatment with both chemicals, generally reduced soybean biomass and, in some cases, reduce

### **05.03.08 Exploring Gene Loci Responsible for Bile Salt Resistance / Sensitivity in Escherichia coli**

**Bidlack,James** *University of Central Oklahoma*

**Satchell,Angeline** *University of Central Oklahoma*

**Smith,Josh** *University of Central Oklahoma*

**Khodadashian,Sasan** *University of Central Oklahoma*

**Aukema,Rachel** *University of Central Oklahoma*

**DeShazer,Jordan** *University of Central Oklahoma*

**Bartley,Kelly** *University of Central Oklahoma*

**Lyon,Maximilian** *University of Central Oklahoma*

Escherichia coli is gram negative bacterium that occurs naturally in the digestive system of most vertebrates. About 10 years ago, a bile salt sensitive strain of E. coli was discovered by Drs. Jim Bidlack and Philip Silverman in a collaborative project with UCO and the Oklahoma Medical Research Foundation. Since that time, our team has been getting closer to finding loci responsible for this unusual phenotype, and it appears that these loci are at or near the yciS and yciM genes. We are now in the process of isolating, cloning, and sequencing the region of DNA involved with bile salt resistance / sensitivity for further characterization. Once cloned, the gene(s) for bile salt resistance and sensitivity will be inserted into counterpart bacterial strains to determine if resistant strains can be made sensitive to bile salts and if sensitive strains can be made resistant to bile salts. Results will provide details for a new gene locus description that includes the location, sequence, and phenotype for bile salt resistance / sensitivity in E. coli.

### **05.03.09 Hypertension and Exercise**

**Wilhite,Tiffany** *Northwestern State University*

**Reilly,Rebecca** *Northwestern State University*

**Mahieu,Jennifer** *Northwestern State University*

**Collins,Leslie** *Northwestern State University*

The health benefits of the exercise are well known, as are the risks associated with high blood pressure. Patient teaching in both of these areas is an important part of the role of a nurse. The aim of this research project was to examine the relationship between moderate exercise and hypertension. We hypothesized that moderate exercise, as part of a change in lifestyle, lowers systolic and diastolic blood pressure readings. The result of our research showed that physical activity can help can help patients maintain blood pressure within normal limits. Exercise, in any form, is an important part of a healthy lifestyle that contributes to lowering blood pressure without pharmacological management. In the clinical setting, nurses should be actively involved in educating patients about all of the lifestyle modifications that need to be made to manage hypertension. Physical activity, nutrition and medication adherence are some of the topics that need to be discussed with all patients diagnosed with hypertension or prehypertension.

### **05.03.10 A REVIEW OF 3-D PRINTING IN BIOLOGY: TECHNIQUES AND FUTURE DIRECTIONS**

**Curtiss,Joshua** *Northeastern State University*

**Wang,Kevin** *Northeastern State University*

Three dimensional printing is one of the pinnacles of modern day technology. Robotics, computers, engineering, and biology all meet at the 3-D printer. Three dimensional printing has come a long way in recent years. Since its inception in 1984 by Charles Hull, three dimensional printing has progressed from a rudimentary and clunky machine to a streamlined tech-savvy powerhouse with limitless possibilities. In this review we will look at the history of three dimensional printing, current technology and research, and where the future can take three dimensional printing.

### **05.03.11 Regenerative Therapy With the Use of Mesenchymal Stem Cells**

**im,sun il** *Northeastern State University*

**Wang,Kevin** *Northeastern State University*

With the limitations in embryonic stem cell research, scientists have been facing their research over adult stem cells. One of the adult stem cell in our body, mesenchymal stem cell is used to secrete several cytokines such as interleukin-18 and interleukin-12 to drive apoptosis of cancer cells. And mesenchymal stem cell was also able to differentiate into proteins like DSP and DMP-1 which is responsible for structuring bone and tissues for tooth. There are cases where they were successful with the treatment using mesenchymal stem cells and several trials are being conducted to explore the possibilities of adult stem cell. Due to some of positive effect toward mesenchymal stem cell treatment, facilities that can store stem cells and researchers who study them are preparing for the popularization of treatment using stem cells.

### **05.03.12 Dose response and time course of corticosterone induced gene expression level changes in MAPK pathway**

**Wu,Ning** *Southeastern Oklahoma State University*

**Frizzell,Andrea** *Southeastern Oklahoma State University*

**Golden,Teresa** *Southeastern Oklahoma State University*

MAPK pathways are the central signaling elements, which pass the stimuli from cell surface receptors into cytoplasm and further transcriptional responses. The strength of MAPK signaling determines the duration of biological responses and many physiological outcomes. This research used corticosterone treated PC12 cells, a widely used in vitro neuronal model, to study the dose response and time course of corticosterone induced gene expression level changes in MAPK pathway, and further the potential mechanisms of MAPK genes involved in MDD development. The results showed that the expression levels of MKP-1, P38, and PKC were significantly up-regulated in response to corticosterone concentration increasing (100  $\mu$ M). In addition, MKP-1, PKC, P38, IP3R, PLC, and ERK gene expression levels were all elevated after 48 hours treatment with 50  $\mu$ M of corticosterone, which induced significant cell death and cell conformational changes. In conclusion, high dose or long term treatment of neuronal cells with corticosterone can increase P38, PLC, and MKP-1 gene transcription, and further, induce ERK, PKC, and IP3R gene over expression, which will eventually cause neuronal cell death and neurite malformation.

**05.03.13 Clinical Studies in Pediatric Emergency Medicine: Utilizing PECARN sites for studies in Sickle Cell Disease Vaso-Occlusive Pain and Serious Bacterial Infections in Infants**

**Berent,Robyn** *University of Oklahoma*

**Bogie,Amanda** *University of Oklahoma*

The Children's Hospital of Oklahoma has recently joined the Pediatric Emergency Care Applied Research Network (PECARN), and is conducting multiple clinical studies in the Emergency Department (ED). PECARN inter-institutional collaborations across the United States allows for greater patient enrollment numbers, diversified patient populations, and leads faster data generation. Here we present two clinical studies currently ongoing in the Pediatric Emergency Department at the Children's Hospital: 1.'Arginine Therapy for the Treatment of Pain in Children with Sickle Cell Disease (SCD)'. Vaso-occlusive pain episodes are the leading cause of hospitalizations and ED visits for SCD patients. Nitric oxide, produced by the oxidation of L-arginine, is a potent vasodilator, exerts pleiotropic effects on circulating blood, and inhibits platelet adhesion. SCD patients have been found to have acutely depleted L-arginine levels. This study finds a 54% reduction of opioid medication usage in children receiving 5 days of arginine therapy compared to control groups. 2.'RNA Transcriptional Profiling for Diagnosis of Serious Bacterial Infections (SBIs) in Young Febrile Infants'. Fever is a common reason for ED visits in children, with a small proportion having SBIs. Infants 60 days or younger have the highest risk for SBI. Current diagnosis methods utilizing biological fluid cultures are challenging for rapid diagnosis in the ED, with problematic fa

**05.03.14 The influence of corticosterone on SKA family gene expression: a potential mechanism of major depressive disorder development**

**Wu,Ning** *Southeastern Oklahoma State University*

**Bastible,Stephen** *Southeastern Oklahoma State University*

**Golden,Teresa** *Southeastern Oklahoma State University*

As a mitotic component essential for the accuracy in human cell division, the SKA complex, composed of subunits SKA1, SKA2, and SKA3, serves to stabilize interactions between microtubules and the kinetochore. The core structure of the SKA complex is composed of two molecules of SKA1-SKA2 heterodimers, each associating with a SKA3 homodimer. Of the three subunits, primary association with microtubules results from the action of SKA1. Additionally, studies have identified SKA2 involvement in the regulation of the level of adrenal cortex hormone, with diminished SKA2 expression found in suicide decedents. Previous studies have described how destruction of the SKA complex structure can result in the failure of chromosomal segregation and cell death. This study investigated the responses of SKA family gene transcription to the corticosterone hormone treatment by using PC12 neuronal cells. The results demonstrated the reduction in the cellular expression of ska1, ska2, and ska3 after exposure to varying concentrations and durations of corticosterone, which provided additional evidence that the HPA-axis might be involved in major depressive disorder development.

**05.03.15 A Review of Inhibiting Polyphenol Oxidase Activity in Apples by Agrobacterium tumefaciens-Mediated Transformation**

**Skorupski,Taylor** *Northeastern State University*

**Wang,Kevin** *Northeastern State University*

Abstract Apples undergo an enzymatic or oxidative activity that causes browning when bruising, slicing, or even biting into an apple occurs. Anti-browning agents such as ascorbic acid is used widely in the industry but only prolongs shelf life another three to seven days. One company, Okanagan Specialty Fruits, is taking a step further and transforming the apple. This apple is called Arctic Apple and is transformed by the use of gene silencing. Okanagan Specialty Fruits uses RNAi with co-suppression to silence the four genes that produce the polyphenol oxidase enzyme that causes browning. With RNAi, Okanagan Specialty Fruits also uses Agrobacterium tumefaciens-mediated transformation as a vector in order to create these genetically engineered apples.

**05.03.16 Next-generation sequencing and bioinformatical analysis of corticosterone induced PC12 cell transcriptome**

**Wu,Ning** *Southeastern Oklahoma State University*

**Joines,Allison** *Southeastern Oklahoma State University*

**Shahan,Justin** *Southeastern Oklahoma State University*

**Golden,Teresa** *Southeastern Oklahoma State University*

Major depressive disorder (MDD) is a highly prevalent psychiatric disorder that affects about 10% of the population worldwide. Previous studies confirmed that hypothalamic-pituitary-adrenal (HPA)-axis hormones involved in MDD development. This study explored the gene expression profile that corresponded to corticosterone treatment of neuronal cells by using next-generation sequencing RNAseq technology followed by bioinformatical analysis. The sequencing results showed that total 33,737 transcripts were assembled from the 10G nucleotides data with 89.9% multi exon transcripts. The bioinformatical analysis results demonstrated that total 1,274 genes were identified with the expression level changes at least two folds between control and experimental groups. Among them, 647 genes were up-regulated while 627 genes were down-regulated in response to corticosterone treatment. All identified genes were against the data in NCBI GO database for functional studies, which included molecular function, biological process, and cellular component analysis. The potential body systems that were affected by the expression level changes of those genes were also investigated.



### **05.03.17 Skin to Skin**

**Haftman, Laura** *Northwestern State University*

**Koehn, Chassidee** *Northwestern State University*

**Collins, Leslie** *Northwestern State University*

**Mahieu, Jennifer** *Northwestern State University*

The way a newborn comes into a world can have risks and benefits. There is very good evidence that newborns who are placed skin to skin with their mother immediately after birth make the transition from fetal to newborn life with better respiratory, temperature, and heart rate with less crying and bonding with mom. Mothers who hold their babies immediately after birth has less breast engorgement and breastfeed for longer duration. Hospital protocol can be initiated for uninterrupted skin to skin contact immediately after birth with vaginal and cesarean births. The first hours after birth are a very special time for mother and baby to form a special bond. This process should not be interrupted unless unstable conditions. This special time should be honored and protected that will also produce many benefits for mom and baby.

### **05.03.18 Skin-to-Skin after C-Sections**

**Adams, Courtney** *Northwestern State University*

**Howard, Tiffany** *Northwestern State University*

**Rodriguez, Solena** *Northwestern State University*

The immediate initiation of skin to skin contact following birth has many benefits. The focus of this research was to determine the benefit of an increase in the success rate of exclusive breast feeding when skin to skin contact is initiated following a cesarean birth. Traditionally in C-sections, infants were immediately removed from the operating room and taken to the nursery for newborn care. This prolonged the amount of time between birth and initial maternal bonding. Our research suggests initiating skin to skin contact within the first 5 minutes following Cesarean birth greatly improves the overall bond between mother and infant. Creating this bond results in improved breast feeding success rates. Our research also shows that implementing this intervention results in higher LATCH scores for the infant and greater maternal satisfaction overall.

### **05.03.19 Comparison of Stress Response Pathways**

**DeNeen,Whitney** *Northeastern State University*

**Jones,Alexis** *Northeastern State University*

Elevated hormonal concentrations, such as cortisol and testosterone can positively affect an athlete's overall performance during a competition, and in many cases, are necessary to be able to perform exercise. In order to determine 1) effects of high-intensity, long-duration exercise, such as ultra-marathon running, on the neuroendocrine system and 2) whether any sex differences exist in the neuroendocrine response to ultra-running, we examined the activity of the hypothalamic-pituitary-adrenocortical (HPA) axis production of cortisol (CORT) as compared to the autonomic nervous system production of salivary alpha-amylase (AA), both of which are known to respond to exercise. Saliva samples were collected at prescribed distances using the passive drool method from 15 male & 25 female runners participating in the Pumpkin Holler Hunnerd race. We found that overall CORT and AA tend to increase in all distances from start to finish, except AA in 100K runners, which decreased slightly. Only CORT in 25K runners increased significantly during the race. Males running 50K had the greatest increase in CORT, while males running the 25K showed the greatest increase in AA. These results suggest that at distances below the ultra-marathon, the HPA axis and autonomic nervous system respond in a parallel pattern; however, at ultra-marathon distances, the response of these two systems begins to differ. Additionally, these pathways differ in their response between males and females.

### **05.03.20 Nurse to Patient Ratio**

**Wheeler,Cortney** *Other*

**Nielsen,Jessica** *Other*

**Wreath,Amy** *Other*

Abstract The nurse to patient ratio is an important aspect to the quality of care a patient receives during a hospital stay. Our research shows that the more patients a single nurse is responsible for at a given time, the higher the risk for medication administration errors, patient injuries, insufficient charting, stress on the nurse, and stress on the patient. On the other hand, a lower nurse to patient ratio enhances the quality of care by creating a more relaxed environment for the patients and the nurse, helps provide the nurse enough time to chart effectively, administer medications correctly, and allows the nurse the appropriate time to assess the patients and provide comfort and therapeutic talk to the patients. A lower nurse to patient ratio is beneficial to both the patients and the nurses by enhancing the atmosphere and experience overall.

### **05.03.21 Storm Water Runoff: A Tale of Two Cities**

**Hammond, William** *University of Central Oklahoma*

**Bass, David** *University of Central Oklahoma*

Eutrophication of watersheds impacts management practices of wildlife, recreation, and water quality. Storm water runoff events are a primary mode of nutrient introduction into existing watersheds. Of nutrients delivered by storm water runoff, phosphates are a key contributor to eutrophication of a body of water. Some municipalities in Oklahoma have passed ordinances banning use of fertilizers containing phosphorous. We measured the presence of orthophosphates before and after rain events in Norman, where fertilizers containing phosphorus are banned, and in Edmond, where phosphorous is allowed in fertilizers. We sampled three creeks in each municipality within 24 hours prior to a rain event measuring  $\geq 0.5$ ", and resampled within 24 hours following the event. Samples were collected for six consecutive months, from May 2015 through October 2015. All samples were transported to the laboratory on ice and kept cold until tested using a Hach DR-2800 spectrophotometer, following the orthophosphate test protocol. Edmond samples had average post-rain increase in orthophosphates of 734%, while Norman samples showed average post-rain increase of 452%. Our investigation illustrated a significant increase in orthophosphates after a storm in all creeks studied during the six-month period. Nested ANOVA testing did not show significant differences between the two municipalities, but the average difference bears reporting. Additional sampling could further resolve these results.

### **05.03.22 The Reaction of Hypotaurine to Taurine with Reactive Oxygen Species**

**Grove, Roxanna** *University of Central Oklahoma*

**Karpowicz, Steven** *University of Central Oklahoma*

Taurine, 2-aminoethanesulphonic acid, is the most abundant amino acid derived molecule in the cell and plays a significant role in biosynthesis. Taurine is the end-product of sulfur amino acid metabolism. In human, taurine is produced from cysteine through hypotaurine. Taurine plays essential roles in many fundamental biological processes such as osmolality regulation, calcium modulation, membrane stabilization, reproduction, immunity, central nervous system and neonatal development. Despite its many roles and functional properties, its biochemical mechanisms and processes are still unknown. The reaction of hypotaurine to taurine is poorly studied. This project aims to understand the non-enzymatic reaction of hypotaurine to taurine by reaction with four reactive species oxygen (ROS): singlet oxygen ( $^1O_2$ ), hydrogen peroxide ( $H_2O_2$ ), hydroxyl radical (OH), and superoxide ( $O_2^-$ ). Hypotaurine and taurine concentrations were measured by high-performance liquid chromatography (HPLC) assay using o-phthalaldehyde-2-mercaptoethanol (OPA-2-ME) for colorimetric derivatization. The products were analyzed by electrospray ionization with mass spectrometry (ESI-MS) and tandem mass spectrometry (MS/MS). The results demonstrate that hypotaurine scavenged highly reactive hydroxyl radicals in vitro. Hypotaurine did not react with singlet oxygen, but did react with hydrogen peroxide and superoxide. An unknown molecule was detected by ESI-MS from reaction of hypotaurine with superoxide.

### **05.03.23 Blood Circulation and Umbilical Cord Clamping in Newborns**

**Waugh, Katelyn** *Northwestern State University*

**Thompson, Andrea** *Northwestern State University*

**Mahieu, Jennifer** *Northwestern State University*

**Collins, Leslie** *Northwestern State University*

This research is based on whether it is more beneficial to have early umbilical cord clamping or delayed umbilical cord clamping for blood circulation purposes. Early umbilical cord clamping is beneficial, because it reduces the risks for jaundice. The time for this would be 15-25 seconds after birth. As soon as the cord is clamped, there is no way for any more oxygenated blood to reach the neonate, so the circulating blood volume will decrease in the infant. (Bechard, 2015). Delayed umbilical cord clamping is beneficial, because it reduces the risks for intraventricular hemorrhage. The time for this would be 30 seconds to 5 minutes after birth. Some studies support delayed umbilical cord clamping, because there are interventions to treat jaundice. Studies have shown that newborns receive about 80 mL of blood from the placenta up to a minute after birth by the umbilical cord, and it can possibly reach up to 100 mL 3 minutes after birth. (The American College of Obstetricians and Gynecologists, 2012). Both options show reasonable benefits and risks. No matter what the research suggests, the decision of which method to use is the mother's.

### **05.03.24 Modeling How Climate Change May Affect the Distribution of Five Palm Species**

**Tran, Huyen** *University of Central Oklahoma*

**Butler, Chris** *University of Central Oklahoma*

Over the last century, global temperatures have risen approximately 0.6-1.0° C. Climate change has affected the distribution of numerous animals and plants. Species such as palms are usually found in moist, warm areas and there is a lack of information on how climate change could affect their distribution. We investigated how climate change may affect the future distribution of five different palm species in the southeastern USA: *Sabal etonia*, *Serenoa repens*, *Sabal palmetto*, *Sabal minor*, and *Rhapidophyllum hystrix*. *S. etonia* is found in scrubs and sandy soils. *Serenoa repens* grows on the coastal plain and is cold-sensitive. *S. palmetto*, is found in the tropics and subtropics, ranging from Florida to Cuba and the Bahamas. *S. minor*, dwarf palmetto, found in North Carolina west to Oklahoma and south to Florida and Texas. *Rhapidophyllum hystrix* is native to Mississippi, Alabama, Georgia, South Carolina, and Florida. The location data was obtained through the Global Biodiversity Information Facility, as well as from New York Botanical Gardens, Cornell University, and herbaria in South Carolina, Florida, and Texas. We used Maxent to determine which ecogeographical variables most affected their distribution and to project how their ranges may shift by the 2050s and the 2070s under four different climate change scenarios. The Maxent models closely matched the current ranges of the five palm species. These models show that palms may shift northeast as an effect of climate change.

## **05.03.25 How Video Games are Negatively Effecting the Diets of Our Children**

**Koehn, Sadie** *Northwestern State University*

**Gulick, Jessica** *Northwestern State University*

Video games have become very popular over past years. Children seem to want to stay inside to play, instead of enjoying outside activities. It has been shown that children spend many hours after school in front of a screen, which is called screen time. With increased screen time, the likelihood of consuming non-nutritional food greatly increases. Our research suggests that this one of many causes of childhood obesity. Limiting screen time, providing healthy meals, and increasing physical play are all ways to decrease the chances of childhood obesity.

## **05.03.27 Wound Healing with Hyperbaric Oxygen Therapy**

**Harmon, Chelsea** *Northwestern State University*

**Moyer, Tandi** *Northwestern State University*

**Mahieu, Jennifer** *Northwestern State University*

**Collins, Leslie** *Northwestern State University*

Hyperbaric oxygen therapy is a continued delivery of oxygen with an increased atmospheric pressure. The research is compelling and has shown positive response for those using the hyperbaric oxygen therapy for wound healing. Diabetic patients have seen increased drastic wound healing times with the use of the hyperbaric oxygen chamber. Vascular disease, diabetes, radiation necrosis, mixed soft tissue infections, refractory osteomyelitis, some traumatic wounds are all types of wounds seen when using hyperbaric oxygen chamber. Patients should be told the contraindications of hyperbaric oxygen therapy. They include: chemotherapy, claustrophobia, febrile disorders, sinus surgery, seizures. The outcomes are remarkable in wound healing showing twenty treatments with various wounds shows new tissue growth and the edges of the wound show new granulation and approximation. Evidence supports the use of hyperbaric oxygen therapy.

### **05.03.30 Growth and Regulation of Sugar Response in Escherichia coli**

**Nesbit, April** *East Central University*

**Wright, Heather** *East Central University*

**Postoak, Brandon** *East Central University*

*Escherichia coli* is a gram-negative bacteria usually found within the digestive tract of many organisms, and *E. coli* in human guts utilizes sugars from our diet to grow. Although most *E. coli* is relatively harmless, there are variants that can cause food poisoning. Therefore, we studied sugar metabolism in *E. coli* to better understand how our diets impact *E. coli* growth in human intestines. We focused on the putative transcription factors YfaX and YggD, which are encoded by the *yfaX* and *yggD* genes, respectively. The *yfaX* gene is in the same operon as rhamnose utilization genes, and the *yggD* gene is homologous to a gene encoding mannitol regulator. Our hypothesis is that both of these genes encode proteins involved in regulation of sugar metabolism. To understand the role of these genes in sugar metabolism, we performed growth curves with a wild-type strain, a strain lacking *yfaX*, and a strain lacking *yggD* in rhamnose, glucose, and mannose. In addition, we fused *yfaX* or *yggD* promoters to a reporter gene called *lacZ*, whose expression can easily be detected by colorimetric assays, to determine whether YfaX or YggD regulate their own expression. We will continue to study the effects of sugar metabolism in hope of improving general knowledge pertaining to sugar regulation.

### **05.03.31 Exploring Edge Effect and the Impact of Invasive Vegetation on Snowy Plover Nesting Success**

**Sullivan, Jonathan** *Northeastern State University*

**Jog, Suneeti** *Northeastern State University*

**Bried, Jason** *Other*

Habitat fragmentation and invasive species may alter the distribution, abundance, and behavior of organisms and are considered among the greatest threats to biodiversity. Many studies have documented negative edge effects and impacts from species invasion, but we know little about the interaction of these threats on species of concern. Our objective was to study the combined effect of habitat edge and plant species invasion on nesting success in the rare and declining snowy plover (*Charadrius nivosus*) at the Salt Plains National Wildlife Refuge (SPNWR), in Oklahoma. We expected reduced nesting success with proximity to edge, and to see a more negative effect from edges dominated by invasive saltcedar (*Tamarix* spp.) than by native vegetation. Preliminary analysis indicates that there is increased depredation near habitat edges, and depredation is higher near saltcedar edges than native vegetation edges.

### **05.03.33 Genetic Manipulation of Chlamydia trachomatis Inclusion Membrane Protein CT228 using the Adapted TargeTron System**

**Behar,Amanda** *Oklahoma State University*

**Lutter,Erika** *Oklahoma State University*

**Fisher,Derek** *Other*

**Johnson,Cayla** *Other*

Chlamydia trachomatis is the most frequently reported bacterial sexually transmitted infection. Even after a C. trachomatis infection is treated, there is an increased risk for the development of pelvic inflammatory disease and cervical cancer, but the mechanisms are poorly understood. As an obligate intracellular pathogen, C. trachomatis usurps many host cell-signaling pathways from within a membrane bound vacuole, called an inclusion. C. trachomatis is also known to synthesize and secrete via the type III secretion system, inclusion membrane proteins (Incs) that insert into the inclusion membrane and serve as the interface between Chlamydia and the host. C. trachomatis is the first bacterial pathogen observed to recruit myosin phosphatase (MYPT1) for means of host cell exit, and does so through the chlamydial Inc protein, CT228. In this study, the chlamydial TargeTron system was used to genetically inactivate CT228 in the C. trachomatis genome. TargeTron insertion was confirmed by PCR and expression of the CT229-CT224 operon of the mutant was verified by RT-PCR to rule out polar effects. The CT228 mutant was verified to be deficient in CT228 production and MYPT1 recruitment by immunofluorescence. This study demonstrates successful gene inactivation of the chlamydial protein CT228 and confirms the role of CT228 in MYPT1 recruitment. Additionally, these studies provide a platform to further investigate the role of CT228 in chlamydial pathogenesis.

### **05.03.35 Pupation height differences in field collected and laboratory fruit flies (Drosophila melanogaster)**

**Huffman,Jessica** *Southwestern Oklahoma State University*

**Aracena,Jimena** *Southwestern Oklahoma State University*

Fruit flies, Drosophila melanogaster, show variation in their pupation height. Some pupate very low in the walls of their vials, while others pupate higher. Our purpose was to record the pupation height and number of pupae in two different strains of flies (lab flies and field-collected flies) in order to see if there was genetic variation. For each strain, we placed five male and five female flies in vials lined on the inside with transparency paper. The flies were allowed to lay eggs for 24 hours and then they were removed. Nine days later, we recorded the number of pupae and their location on the wall of the vial. The lab flies produced more offspring that reached pupation stage than the field flies. We recorded the number of pupae above and below a 3.5 cm mark from the media surface. Both strains of flies pupated significantly more below the 3.5 cm mark. The higher number of pupae produced by the lab flies shows that they may be more adapted to living in laboratory conditions. The fact that both strains pupated significantly more often in the lower half of the vial could be related to energy conservation when climbing to pupate. This effect may also depend on density. A higher density may cause the larvae to climb higher to avoid the other larvae.

### **05.03.36 Patch location preference during foraging in fruit flies (*Drosophila melanogaster*)**

**Gunning, Courtney** *Southwestern Oklahoma State University*

**Aracena, Jimena** *Southwestern Oklahoma State University*

Fruit flies (*Drosophila melanogaster*) have a particular foraging behavior on patches, which depends on food quality and their physiological state. The purpose of my experiment was to determine the preference of feeding position for the flies on a small patch of food. Specifically, we were interested in testing their preference for feeding on the side, middle, or corners of a dish. Groups of fifty flies were allowed to feed on a patch of wells filled with sucrose solution for ninety minutes. They were filmed from above to record their location on the patch. We analyzed the recordings in five-minute increments and noted that the number of flies on the patch increased over time. We concluded that the flies have a significant preference for feeding on the sides and the corners of the patch. One of the possible explanations for this behavior is thigmotaxis during foraging behavior on the patch.

### **05.03.37 Antibiotic Resistance in *Staphylococcus aureus* Isolated from Cystic Fibrosis Patients**

**Eleshy, Rawan** *Oklahoma State University*

Cystic fibrosis (CF) is a common genetic diseases caused by a mutation in the CFTR gene. The mutation leads to dehydrated thick mucus and impaired mucociliary clearance. Thus, the environment within the CF lung airways becomes ideal for bacterial colonization. *Staphylococcus aureus* is one of the first colonizers in the CF lung and is prevalent throughout the life of CF patients. It is very adept at developing resistance to antibiotics; therefore, it is of great concern to the medical community. This study investigates the prevalence and presence of antibiotic resistance genes within *S. aureus* isolates from CF patients of various ages. Prior studies identified nine genes that are correlated with antibiotic resistance in CF patients. Isolates were tested for the presence of any of these resistance genes by PCR. Susceptibility tests were performed to determine if these isolates show a resistance phenotype. Surprisingly, some isolates contained the resistance genes, but did not show resistance in the susceptibility tests. Other isolates showed resistance on Kirby-bauer plates without the presence of genes. Understanding the antibiotic resistance mechanisms of *Staph aureus* isolates from CF patients will provide significant insights into the complexity of CF infections and may help in future patient treatments.



### **05.03.42 Biodiversity of Tulsa Community College Land Plot (Pond Bank/Downed Trees vs. Interior Forest)**

**Massengale, Braxton** *Tulsa Community College*

**Swanson, Mark** *Tulsa Community College*

As the human population and the subsequent demand for natural resources continues to increase, the need for increased awareness and protection of wildlife in order to assure a healthy level of biodiversity. The purpose of this study is to demonstrate the amount of animal diversity that can be observed in the small bottomland hardwood forest (approximately 5-6 hectares located within an urban setting) owned by Tulsa Community College. We observed the diversity between the interior of the forest and the edge of the forest near a pond bank. We used 3 infrared trap cameras for this study with two of the trap cameras being placed on fallen logs (one in the interior of the forest and the other on the forest edge) and one camera placed approximately one foot of the ground in the interior forest near observed animal tracks. The traps were baited with a scent bait. We also observed the level of animal activity (number of captures per species each day) at different times of day as well as according to the moon phase. We observed a total of 7 mammal species and 4 bird species. This study did not reveal any definite correlation between moon phase and an increase in animal activity. The findings from this research could be used to raise awareness of the wildlife present on the Tulsa Community College grounds. The findings could also serve as a reference for future research or conservation projects at Tulsa Community College.

### **05.03.43 A Cross-Species Comparison of Distance Traveled in Four New World Primates**

**LaVictoire, Rebecca** *Other*

Four species of primates are found on the Osa Peninsula of Costa Rica: mantled howler monkeys (*Alouatta palliata*), spider monkeys (*Ateles geoffroyi*), squirrel monkeys (*Saimiri oerstedii*), and white-faced capuchins (*Cebus capucinus*). This study aims to compare distances traveled between the four species. It is important to study the home ranges and travel patterns of these species for conservation purposes. Travel and home ranges also have evolutionary implications: what are the trade-offs for smaller or larger ranges? Certain morphological and behavioral traits are associated with greater or smaller distances traveled. I hypothesized that due to diet and physical adaptations, the highly frugivorous *A. geoffroyi* would travel the most over the shortest time period, and that the folivorous *A. palliata* would travel the least distance. I tracked the distance traveled over time using a GPS. The results indicated that *S. oerstedii* traveled the most of the four species. Their pattern of travel was less consistent than the other species. These results could indicate that size and diet play an important role in determining a primate's home range, and the amount of energy they will allocate to daily travel.

#### **05.03.44 Growth Characteristics of Tree Saplings at an Urban Cross Timbers Forest in Central Oklahoma**

**Esqueda, Carmen** *University of Central Oklahoma*

**King, Chad** *University of Central Oklahoma*

Changes in forest composition for the Cross Timbers ecoregion has been occurring within the past 50 years. Within central Oklahoma, many Cross Timber forest tracts are now surrounded by urban areas, where research studies remain limited. Lake Stanley Draper (LSD) of Oklahoma City is one example of this forest type. One forest tract (157 ha) at LSD was used to observe growth characteristics of *Quercus* and non-*Quercus* tree saplings (2-8 cm DBH) and environmental factors that may potentially affect growth. Nine point-center-quarter transects resulted in the collection of 108 sapling cross-sections from 9 different tree species. *Quercus* and non-*Quercus* species have shown no significant difference in mean tree height, mean surrounding stem density, and mean percent open canopy (all  $p > 0.05$ ). *Quercus stellata* Munchh. sapling age has ranged from 9 to 64 years with an average radial growth rate of 0.61 mm/yr ( $n=20$ ). Ages and radial growth rates will be determined for the remaining eight species. From estimated growth rates, predicting future forest composition is possible. This knowledge is useful because it provides applicable insight on what compositional changes, if occurring, are currently taking place within the Cross Timbers.

#### **05.03.45 Labor Positioning for Maternal Comfort**

**Stelling, Merilee** *Northwestern State University*

The purpose of this study is to educate expecting mothers of the maternal benefits of choosing different types of laboring positions over the traditional lithotomy position. Laboring mothers engaged in alternate laboring positions (hands and knees, squatting, lateral), followed their body's natural urge to push, and used replacement means of pain control. Results showed that women who approached the labor and delivery process using the alternative position above, had a decrease in perineal trauma and reduction of pain. The mothers were also able to refrain from chemical barriers (i.e. epidural, narcotic pain medication) making it possible for immediate engagement in care of the newborn. This study concluded that changing to the above mentioned positions throughout the delivery process provides maximum maternal comfort, and it is recommended that nursing staff are educated in the above means of alternate laboring positions and strive to encourage laboring mothers to partake in such

#### **05.03.46 Calculation of Enzymatic Activity in Adenosine Deaminase in Escherichia Coli**

**Tatum, Baylee** *University of Central Oklahoma*

The *tadA* enzyme is responsible for the chemical substitution of the standard adenosine base pair with the nonstandard hypoxanthine base pair at specific wobble positions in the *E. coli* transcriptome. This substitution allows for flexibility in the translation of proteins by increasing the number base pairs the edited nucleotide can interact with. Due to the limited amounts of the *tadA* enzyme in *E. coli*, recombinant DNA techniques had to be utilized to acquire a quantifiable amount of the enzyme. The genetic sequence translating for *tadA* was replicated using a sequence specific primer and polymerase chain reaction (PCR). By inserting the replicated *tadA* gene into the 1655 *E. coli* culture, the gene could be ligated into an *E. coli* expression vector and cloned into the culture. Once the recombinant vector was cloned into the *E. coli*, the protein was allowed to accumulate in vitro and was purified using a histidine tag and subsequent histidine purification technology. A nucleotide specific assay was performed on the purified enzyme to quantify the activity of the *tadA* enzyme. This data would demonstrate how efficient the protein is at high concentrations and as well as its enzymatic threshold at optimal conditions.

### **05.03.47 Microclimate Effects on Radial Growth of Celtis in Central and Western Oklahoma**

**King, Chad** *University of Central Oklahoma*

**LaMere, Kaitlyn** *University of Central Oklahoma*

Knowledge about climate-growth associations comes from a select group of tree species often due to their wide distributions and/or longevity. However, there has been very little research on the climate-growth associations in *Celtis* species, a group of species that are becoming increasingly more common. In light of climate change models, it is critical to understand the effect of climate on the radial growth of three *Celtis* species found in Oklahoma. Assessing the climate-growth associations in *Celtis* will provide data on changes in species distributions. We hypothesized that trees at the edge of their distribution would have stronger correlations with climate. In this research, increment cores from *Celtis* at two locations: central Oklahoma (Edmond, Oklahoma) and Alabaster Caverns State Park in western Oklahoma. Twenty cores (10 trees) per site were prepared using standard tree-ring procedures and crossdated to assign calendar years to each tree-ring. Analysis of climate-growth associations using Pearson correlation indicated significant associations between growth and climate variables. However, different responses were detected in trees at the two sites. One explanation is western *Celtis* is often restricted to draws and canyons where moisture availability is not limiting. This suggests that microclimate conditions in western Oklahoma are important for growth of *Celtis* and changes in precipitation and temperature patterns will likely have a negative effect.

### **05.03.48 Before the Burn: Repeat Photography in the Peloncillo Mountains**

**Hammond, William** *University of Central Oklahoma*

**Stone, Paul** *University of Central Oklahoma*

Photographs have been utilized to capture detailed information from landscapes since the advent of photography. Repeat photography allows visualization of change at the same site across time. Climate change is predicted to alter every ecosystem on Earth. To gather a current photographic baseline of landscape information, we established an archive of repeat photographic collection points (RPP) in a 100km<sup>2</sup> region of the Peloncillo Mountains, Southwest New Mexico. The Peloncillo Mountains are part of the Madrean Sky Islands, a globally recognized biodiversity hotspot. We established 111 RPP in the study area between May and August, 2015. During June, the Guadalupe and Hog Canyon fires burned over 16,000 hectares in the Peloncillos. Half of the RPP established in May 2015 were located inside burn perimeters. During July and August 2015, additional RPP were established, with emphasis on establishing points in recently burned areas. During August, some of the burned RPP were recaptured to provide a before and after burn data set. These RPP will provide a unique look at succession in the study area. While the ultimate goal of our study was to establish a landscape baseline using RPP against which climate change will ultimately be measured, disturbances such as the observed fire events illustrate the wide range of uses for RPP data.

### **05.03.49 Staphylococcus Aureus Biofilm and Planktonic Secreted Products Effects on Myofibroblast Differentiation**

**Hall,Preston** *University of Central Oklahoma*

**Vaughan,Melville** *University of Central Oklahoma*

**Kshetri,Pratiksha** *University of Central Oklahoma*

**Brennan,Robert** *University of Central Oklahoma*

Wounds often become chronic by staying in the inflammatory stage of the healing process for an excessive period of time. Fibroblasts' ability to differentiate into myofibroblasts is key for the normal progression of wound healing. Recent findings have shown that secreted products of *S. aureus* biofilms and planktonic *S. aureus* differentially affect viability and inflammatory cytokine production by human fibroblasts, along with human keratinocytes. We set out to determine whether media conditioned by the secreted products of *S. aureus* affected myofibroblast differentiation through immunostaining techniques. We grew normal human fibroblasts on coverslips in media containing 1ng/ml TGF- $\beta$  plus or minus 100  $\mu$ L/ml of the planktonic *S. aureus* secretions or the *S. aureus* biofilm secretions; these were compared to a media-only control group. Our results showed that the secreted products from both planktonic *S. aureus* and *S. aureus* biofilms decreased myofibroblast differentiation in three experiments which indicates that wound healing won't progress in a normal fashion causing the wound to become chronic. Bacterial biofilms are currently difficult to treat, so figuring out how they affect the wound healing process may shed light on how to combat chronic wounds.

### **05.03.50 Ain't No Mountain High Enough: Chihuahuan Pine Distribution in the Peloncillo Mountains**

**Hammond,William** *University of Central Oklahoma*

**cheek,justin** *University of Central Oklahoma*

**Stone,Paul** *University of Central Oklahoma*

Climate change is predicted to alter every ecosystem on earth. The Madrean Sky Islands of the Southwestern United States represent a globally recognized biodiversity hotspot, where a confluence of competing climates and geographies provide varied habitats rich for specialist species. Our study site, Blackwater Canyon in the Peloncillo Mountains, represents one such habitat. Climate change is predicted to result in unidirectional shifts in distribution of montane specialists as the climate warms—up the mountain. Chihuahuan Pine, *Pinus leiophylla*, has been observed exclusively in canyon beds of the Peloncillo Mountains. With warming expected to shift Chihuahuan Pines upslope, we undertook documentation of present distribution. We mapped pines at the study site between May and August 2015. Mapping was conducted using GPS receivers to record location of individual pines or stands of pines. Pine stands within the error of the GPS unit ( $\pm 4$ m) were enumerated, and the number of pines per stand was recorded. We visualized the data in ArcGIS. In total, 4,432 pines were mapped. In June and July of 2015, the Hog Canyon fire burned over 8,000 hectares of the Coronado National Forest, including the upstream half of Blackwater Canyon. Our map serendipitously provides baseline data which will be used in future studies of fire succession in the canyon. Our dataset serves as a baseline from which future observations may be made to determine distribution shifts for pines in Blackwater

### **05.03.51 Analysis of GAPC Genes in Multiple Plant Families Found in Oklahoma Grasslands**

**Spencer,Diana** *Tulsa Community College*

**Acharya,Bipina** *Tulsa Community College*

**Beckham,Jacob** *Tulsa Community College*

**Curry,Brandon** *Tulsa Community College*

**Darbandi,Samira** *Tulsa Community College*

**Eccleston,Brian** *Tulsa Community College*

**Flippin,Emily** *Tulsa Community College*

**Killam,Kameron** *Tulsa Community College*

**King,Stephen** *Tulsa Community College*

**Nehmzow,Katherine** *Tulsa Community College*

The aim of our project was to clone the GAPC gene from the glyceraldehyde-3-phosphate dehydrogenase (GAPDH) gene from plants in Oklahoma grasslands, insert the fragments into plasmid vectors, and analyze the sequences of the resultant clones using current bioinformatics tools. These genes are considered housekeeping genes because they catalyze glycolysis in respiration. Plants were gathered and the DNA extracted with subsequent capture of the GAPC gene through nested PCR. The purified amplicons were ligated into cloning vectors and transformed with HB101 E. coli cells through heat shock methods. The recombinant products were screened on agar plates, multiplied through growth in selective broth, and finally assessed through mini-prep restriction digests. Bioinformatics tools used were FinchTV, CAP3, NCBI Vector Masking, BLASTn, BLASTx and MEGA Muscle Alignment and Phylogenetic Analysis. Our hypothesis stated that the phylogenetic analysis would yield relationships with yarrow indicating most similar sequences and similar to other asters while the winged sumac and *Sabatia compestris* (meadow pink) would yield greater genetic distance.

## **05.03.52 Novice Taxonomists Assess Biodiversity in Hyperdiverse Arthropods Using DNA Barcoding**

**Spencer, Diana** *Tulsa Community College*

**Acharya, Bipina** *Tulsa Community College*

**Bleichner, Jeffrey** *Tulsa Community College*

**Cox, Jordan** *Tulsa Community College*

**Curry, Brandon** *Tulsa Community College*

**DeLeon, Steven** *Tulsa Community College*

**Killam, Kameron** *Tulsa Community College*

**King, Stephen** *Tulsa Community College*

**Noble, Tyler** *Tulsa Community College*

**Rice, Samantha** *Tulsa Community College*

**Yang, Jennifer** *Tulsa Community College*

With an estimated 10-15 million species on Earth, it has become increasingly difficult for taxonomists to effectively identify species. Some morphological keys are only effective at certain stages in an animal's life, so classification of these organisms is problematic. With only 0.01% of species being identifiable by taxonomists, much improvement is needed, particularly with cryptic and hyperdiverse taxa. DNA barcoding has emerged, with broad acceptance, as an adequate method to sort through the biodiversity of our planet. Barcoding has successfully aided in species identification across many taxa since its inception in 2003. The COI gene, classified as a mitochondrial housekeeping gene, exhibits a strong phylogenetic sign due to its universal primers being very robust. COI has a lack of introns, limited recombination, and haploid inheritance. This generates a higher rate of molecular evolution that is swift enough to distinguish between closely related species. Ants, being a hyperdiverse and cryptic taxa, are difficult to identify morphologically. Integration of both methods is rapid and accurate, accelerating the global taxonomic effort.

### **05.03.53 What CHO Cells Say About the Supplements, Cellucor C4 and Astaxanthin**

**Sloan,Dusti** *Tulsa Community College*

**Acharya,Bipina** *Tulsa Community College*

**Cox,Jordan** *Tulsa Community College*

**Curry,Brandon** *Tulsa Community College*

**Eccleston,Brian** *Tulsa Community College*

**Killam,Kameron** *Tulsa Community College*

**King,Blake** *Tulsa Community College*

**Rice,Samantha** *Tulsa Community College*

**Yang,Jennifer** *Tulsa Community College*

**Boatright,Ciara** *Tulsa Community College*

More than one half of the people living in the United States take dietary supplements. However, the Dietary Supplement Health and Education Act of 1994 mandated that dietary supplements were to be regulated as food rather than drugs, leading to less testing overall of dietary supplements. Hence, the present study aims to determine the toxicity of two dietary supplements, Cellucor C4 and Astaxanthin. Toxicity was determined by performing an MTT viability assay on CHO cells. An ANOVA showed that there was a statistically significant decrease in the viability of the cells grown in media containing 1.25% and 2.5% Astaxanthin. The results for the C4 compound were inconclusive. Overall, Astaxanthin has very little toxic effect on CHO cells and the MTT assay is not effective using the Cellucor C4 dietary supplement.

#### **05.03.54 Regional fire history of the south-central United States (1700-2000): The role of drought and humans**

**King,Chad** *University of Central Oklahoma*

**cheek,justin** *University of Central Oklahoma*

**Altbaumer,Samantha** *University of Central Oklahoma*

Research demonstrates historic wildfire across much of the United States. Several studies have documented frequent surface fires in the south central US, however there has been little effort to assess historic fires at a regional scale. We collected fire scar data from 14 sites in three states, Oklahoma, Texas, and Arkansas to analyze similarities and differences in historic fire frequency and magnitude at the regional scale. We obtained fire scar data via the fire history database for Texas and Arkansas, while fire scar data for Oklahoma was obtained from published literature. We used fire scar data to identify exceptional fire years, from the time period of 1700-2000 (300 years). We conducted epoch analysis to correlate drought years to exceptional fire years over the 300 year period. We observed a total of 15 exceptional fire years based on magnitude and number of sites experiencing fires within that year. Epoch analysis found no significant correlation between drought and exceptional fire years over the period of 1800-1899. Yet epoch analysis showed significant correlation between drought and exceptional fire years over the period of 1900-1999, with a lag of negative one year. Our results suggest that other factors besides drought are contributing to exceptional fire years in the south central US. This is consistent with other studies suggesting interactions between drought and human population density play a role in exceptional fire years in the US.

#### **05.03.55 Caffeine Effects Dupuytren's Fibroblast Proliferation, Migration, but not Tension Maintenance In Vitro**

**Pantoja,Joana** *University of Central Oklahoma*

**Vaughan,Melville** *University of Central Oklahoma*

**Bryson,Matthew** *University of Central Oklahoma*

**Alkadhem,Niyaf** *Other*

Myofibroblasts are contractile, secretory cells of wound healing, fibroses, and contractures. Recently caffeine was shown to reduce fibrotic conditions in rodents. Our goal was to determine caffeine's effect on Dupuytren's contracture cells in vitro. We cultured fibroblasts in three different experimental models for 5 days. Replicate cultures were treated with 5mM caffeine. Immunostaining results showed that caffeine reduced proliferation and alpha-smooth muscle actin. Stress fibers were present in both treated and untreated groups, suggesting the cells would be contractile. Fibroblasts plated in stress-relaxed collagen lattices failed to generate any tension (3 cell types, n=4 each). We then cultured collagen lattices for 3 days to allow tension generation, followed by caffeine treatment. Caffeine failed to inhibit contraction under these conditions (n=4). Fibroblasts remodel and compress collagen using migration-like tractional forces. We predicted that caffeine would inhibit cell migration. Using a scratch plate model, a plug assay, and a nested lattice assay, we determined that 5mM caffeine inhibited migration. Therefore caffeine likely affects cellular pathways related to migration rather than contraction or tension generation. This suggests that treating already-existing fibrotic conditions with caffeine will be more challenging than preventing future occurrences.



### **05.03.56 Phenformin Inhibits Myofibroblast Differentiation in Dupuytren's Contracture Cells Treated with TGF- $\beta$ 1**

**McNamar, Rachel** *University of Central Oklahoma*

**Vaughan, Melville** *University of Central Oklahoma*

Phenformin could be utilized to help treat Dupuytren's contracture (DC) by inhibiting the differentiation and proliferation of myofibroblasts. Myofibroblasts are characterized by an abundance of alpha smooth muscle actin ( $\alpha$ SMA) within stress fibers in the cytoplasm of the cell. TGF- $\beta$ 1 has been used to upregulate the formation of  $\alpha$ SMA and used to promote myofibroblast differentiation. Myofibroblast differentiation is thought to be inhibited by phenformin because it activates the AMPK pathway. This pathway has been found to inhibit TGF- $\beta$ 1 induced myofibroblast differentiation. This study examined the inhibitory effects of myofibroblast differentiation and proliferation that phenformin has on DC cells treated with TGF- $\beta$ 1. To investigate these inhibitory effects, three groups of DC cells were cultured for 48 hours and analyzed. One group acted as a control, while the other two were treated with TGF- $\beta$ 1. One of those groups were treated with phenformin. Proliferation was determined using a click-EdU culturing and staining procedure; differentiation was determined by visualizing  $\alpha$ SMA using immunocytochemistry. Through qualitative analysis of the data collected through fluorescence microscopy, the group treated with phenformin demonstrated suppression of myofibroblast differentiation and had no effect on cell proliferation. Our future goal is to supplement these results by using other myofibroblast-appropriate functional bioassays.

### **05.03.57 The Effects of Medium Viscosity on Human Cell Migration**

**Nguyen, Vina** *University of Central Oklahoma*

**Vaughan, Melville** *University of Central Oklahoma*

**Karpowicz, Steven** *University of Central Oklahoma*

Human bronchial epithelial cells have been utilized in various areas of biological research. Specifically, these types of cells have been used to study the function of tiny, hair-like structures known as cilia. Cilia take part in many important roles in the lungs, some of which include locomotion and the ability to sense what is going on in the environment around them. The purpose of this study is to examine how ciliated lung cells respond genetically to viscous medium, as well as associating these modifications to the known physical changes within cilia, along with the behavior of the cells. Because human bronchial epithelial cells are rather expensive and can be delicate to work with, fibroblasts will be used in the first part of the study. The fibroblasts were cultured in suspension within welled plates and treated with viscous media on one side and non-viscous media on the other to determine whether viscous media would affect the growth rate of the cells. The data was then analyzed and the results demonstrated that no significant changes were found in the growth rate of the cells. This experiment will be conducted again using human bronchial epithelial cells, as well as the isolation and sequencing of RNA to determine the different patterns of gene expression within the cells cultured in various viscous medium.

### **05.03.60 Characterization of Tension-Maintaining Skin Equivalents**

**Hilal,Mona** *University of Central Oklahoma*

**Law,Ting Wei** *University of Central Oklahoma*

**Vaughan,Melville** *University of Central Oklahoma*

Myofibroblasts are wound-healing cells produced by the differentiation of fibroblasts. In addition to the crucial role they play in wound healing, their proliferation and differentiation is key to understanding many biological and pathological processes such as tumor progression and hypertrophic and keloid scars. Tension is required in order for fibroblasts to differentiate into myofibroblasts. A portable, inert, and tension-maintaining skin-equivalent model was thus developed in order to allow for their study. The engineered tissue was prepared by developing a dermal equivalent of normal human fibroblasts and type I collagen mixture plated with keratinocytes. While plastic rings were inserted in the experimental group to provide tension, the control group lacked such plastic rings. After the tissue was allowed to mature, they were processed for frozen or paraffin sectioning and immunostaining procedures. Several different stains were conducted on the tissue: collagen IV to characterize the basement membrane, H&E to ensure that the cells are well spread, EdU to determine cell proliferation, Rhodamine Phalloidin to reveal stress fibers, and E-cadherin and ker-14 to reveal adherens junctions and ensure normal epidermal architecture, respectively. Analysis and quantification of the data revealed that the model does indeed maintain tension, and thus that a certain matrix with specific mechanical characteristics is in fact needed to maintain the myofibroblast phenotype.

### **05.03.61 Taurine and its Effect on Wound Healing Rate**

**Rucci,Gabriel** *University of Central Oklahoma*

**Vaughn, PhD,Melville** *University of Central Oklahoma*

**Karpowicz,Steven** *University of Central Oklahoma*

Taurine is an organic acid that is particularly abundant in human cells, at about 0.1% of our total body weight. Known functions of taurine include formation of bile salts and regulation of cell volume. Recent papers have implicated accelerated wound healing to be associated with taurine supplementation. The general trend of these studies involved injecting taurine into wounded mice and watching them heal. The studies suggest that taurine may be accelerating the wound healing process. All of the studies failed to presume other possible causes, such as hypotaurine build-up within the cell due to excess taurine, of the accelerated wound healing. The primary goal of this study is to determine if taurine is directly affecting wound healing. Methods used are scrape-plate assays using human fibroblasts as a model. Two treatment groups, a control and 100mM taurine were tested. Using Ibidi plugs in each well human fibroblasts were added to each side of the plug and allowed to settle overnight. The following day taurine is added to the treatment groups and the plugs are removed leaving behind two equally sized colonies of fibroblasts separated by an even scar. Pictures were taken using an inverted light microscope at 0 hours, then at 4 hours, and every hour up to 7. Results suggest that taurine itself is not having any significant effect on the wound healing process. In order to follow-up these findings assays using hypotaurine supplementation will be ran and quantified.

### **05.03.62 Evaluating the Mechanism of Induced Resistance by *Pseudomonas putida* Against *Pseudomonas syringae* Infection**

**McGrane, Regina** *Southwestern Oklahoma State University*

**Idris, Rukayat** *Southwestern Oklahoma State University*

As demand for agricultural produce increases, methods for increasing yield are necessary. The project objective is to determine if the rhizosphere bacteria *Pseudomonas putida* can induce resistance in common bean plants to infection by the bacterial-plant pathogen *Pseudomonas syringae*. This project also seeks to evaluate the mechanisms of induced resistance in the model plant, *Arabidopsis*1. We hypothesize *P. putida* may induce resistance in a variety of important crops susceptible to *P. syringae* infection. To evaluate the ability of *P. putida* to induce resistance in common bean plants, we compared *P. syringae* populations and disease symptoms in plants grown in the presence or absence of *P. putida*. Previous work shows *P. putida* initiates the salicylic acid defense pathway in *Arabidopsis*1. We hypothesize NahG, a salicylic acid hydroxylase, may function in induced resistance. To test our hypothesis, we are constructing *P. putida* mutants lacking or overexpressing nahG. Splice-overlap deletion mutagenesis is used to construct deletion mutants, while overexpression constructs will control nahG expression with a constitutive, high activity promoter. Constructs will be compared in ability to induce resistance to *P. syringae* infection in *Arabidopsis*. If *P. putida* is able to induce resistance to infection in a variety of crops, it could be used as a plant health promoting inoculant; understanding its mechanisms will make large scale applications in agricultural settings a viable option.

### **05.03.63 Evaluating Genetic Diversity and Structure of a Mediterranean Gecko (*Hemidactylus turcicus*) Invasion at the University of Central Oklahoma**

**Thomas, Gary** *University of Central Oklahoma*

**Fenwick, Allyson** *University of Central Oklahoma*

**Matheny, Audrey** *University of Central Oklahoma*

**Kimmel, Laura** *University of Central Oklahoma*

Exotic species are excellent models for understanding ecological and evolutionary processes because they spread and adapt to new habitats across short periods of time that can be directly observed. At UCO, Mediterranean geckos (*Hemidactylus turcicus*) were repeatedly introduced to Howell Hall from 1963 to 1965 and 1985 to 1997. In contrast to most invaders that expand quickly over short geographic areas, this species has only spread to 21 buildings over 19–53 years. Our hypothesis, based on previous work in other regions, is that each building hosts a genetically isolated population of geckos and that populations will show an overall pattern of increasing genetic differentiation with increasing geographic distance from the original site of introduction. We are genotyping microsatellites to analyze genetic diversity and genetic structure over short time periods and restricted geographic ranges. To date, we have collected 220 individuals from 21 buildings across campus, and we have genotyped 129 individuals for at least eight microsatellites. Our preliminary data suggest weak to no differentiation among populations across all buildings.

### **05.03.64 Population Structure and Genetic Diversity of Red Imported Fire Ants (*Solenopsis invicta*) at Lake Arcadia**

**Matheny, Audrey** *University of Central Oklahoma*

**Fenwick, Allyson** *University of Central Oklahoma*

We are analyzing the genetic variation and population structure of the red imported fire ant (*Solenopsis invicta*) around Lake Arcadia. In contrast to the recent UCO invasion, Lake Arcadia's population has been established for years. Genetic variation is expected to be low if there was a single introduction and higher if there were multiple introductions. We predict Lake Arcadia will show evidence of multiple invasions, compared to one or two at UCO. Multiple invasions at Lake Arcadia should also result in several genetic clusters. We sampled ants from 16 locations around the lake, compared to 12 samples from UCO. Species identification was confirmed by morphological techniques. To date, we have optimized and genotyped nine published microsatellite loci. Preliminary genetic clustering and genetic differentiation analyses support one panmictic population including Lake Arcadia and UCO. Our preliminary data support the conclusion that there was either a single introduction to Lake Arcadia or multiple introductions with high gene flow. In addition, the social structure of the colonies will be determined using the Gp-9 locus. Comparing these local invasions can reveal patterns and trends that can be used to mitigate future invasions.

### **05.03.65 Investigating Direct Role of Mcm10 in Activating S Phase Checkpoint Kinase**

**im,sun il** *Northeastern State University*

**Das-Bradoo, Sapna** *Northeastern State University*

**Fultz, Brandy** *Northeastern State University*

DNA replication and repair pathways are emphasized to be closely related to prosperity of a living organism. Minichromosome maintenance protein 10, known as Mcm10 is DNA replication factor which interacts with many other proteins like Helicase (Mcm2-7), DNA polymerase alpha and the clamp (PCNA). The focus of the research was to investigate if Mcm10 has a direct role in activation of the checkpoint kinase, Rad53. In the event of replication stress or DNA damage, yeast cells activate checkpoint kinase, Rad53, which stalls the replication fork, prevents late origins from firing and calls for DNA repair. A previous study has shown a negative genetic interaction between Mcm10 and Rad53. The current project was geared towards exploring a direct physical interaction between Mcm10 and Rad53 by yeast-two hybrid assay. Rad53 was amplified from budding yeast and cloned into yeast two-hybrid vector. Positive clones were identified by DNA sequencing and protein expression was confirmed by western blot. Our yeast-two hybrid results suggest that Mcm10 does not directly interact with Rad53. However, we cannot rule out an indirect interaction mediated through another protein. In the future, we plan to study this interaction in vivo by co-immunoprecipitation.

### **05.03.66 A Comparative Mitochondrial Genomic Analysis of Dasypus novemcinctus, a Widespread Organism Endemic to the Americas.**

**Hurst, Amy** *Other*

**Gill, Blake** *Other*

*Dasypus novemcinctus* is a medium-sized, terrestrial mammal which is native to South America and prevalent across the mid and lower portions of the American continent. Since it is a rather ubiquitous organism with such a large range, comparative genomic analyses provide many opportunities of studying multiple facets of its biology. DNA barcoding of *D. novemcinctus* offers much in the way of research into population ecology, for example. This is particularly evident regarding genetic variance and distribution as organisms of this species demonstrate more genetic diversity in the United States than in South America (Huchon, 1999). A tissue sample from a wild *D. novemcinctus* found in Central Oklahoma was collected, and DNA was extracted and amplified via polymerase chain reaction. Using materials from the DNA barcoding and primer kit offered by Carolina®, gel electrophoresis and nucleotide sequencing by GeneWiz® were implemented to confirm identity and compare genomic similarity. The sample collected demonstrated 99% homology to sequence found in the GenBank database. These efforts confirmed positively the identity of *D. novemcinctus* and demonstrated a highly conserved sequence for the chosen locus. Potential benefits of sequencing and barcoding this particular organism are those offered in the fields of research in human medicine as they possess a similar reproductive characteristic uncommon to most mammals.

### **05.03.67 Identifying Organisms Isolated From a Water Cooled Commercial Grade Ice Machine**

**Hurst, Amy** *Other*

**Grinnell, Addy** *Other*

Ice machines have, in recent years, become known as a source of several kinds of contamination in food and in health industries. As such, there have been outbreaks of disease. Different ice machines have different possibilities of contamination types, with some being more liable to have molds and yeasts and others to have complex biofilms that can include organisms like *Escherichia coli* and *Mycobacterium* species. This experiment was conducted using a DNA barcoding kit and primer set from Carolina®, and the sample was collected from an under-counter, water cooled ice machine at 6705 Camille Ave, Oklahoma City, OK 73149. Samples were collected using a sterile cotton swab and stored in a freezer until the DNA could be extracted, amplified, and sequenced. The original results indicated there were multiple species; as such, direct species identification was impossible. However, using microbiological techniques 7 species were isolated, 3 species' DNA amplified, and 2 species' DNA successfully sequenced. The results indicated the presence of *Variovorax paradoxus* as the first sample and either *Gordonia bronchialis* or *Mycobacterium abscessus* for the second sample. These results indicate that while the species present are fairly common and generally not pathogenic in healthy adults, they do possess the capability of causing serious illness, with some strains being resistant to current antimicrobial drug therapy.

### **05.03.68 Caffeinated and Decaffeinated Green Tea Polyphenol Effect on Tumorigenesis in Drosophila Model**

**Taylor, Amelia** *Northeastern State University*

**Ahlander, Joseph** *Northeastern State University*

Antioxidants within green tea have shown promising research in a few limited types of human cancer. Similarities between oncogenic and tumorigenic pathways in *Drosophila melanogaster* and in humans have led to the development of cancer research on fruit flies; however, minimal research with green tea has been tested on tumorigenesis in the *Drosophila* model. This study explored the effects of brewed green tea and concentrated green tea polyphenol extract on *Drosophila* tumorigenesis. The caffeinated brewed green tea resulted in a decreased cancer rate in the fruit flies; however, once the concentration of green tea in the treatment food reached a certain point (75%), the cancer rate began to increase again. It was theorized that there was a threshold in which the amount of caffeine was beginning to overwhelm the positive effects of the tea; consequentially, caffeinated and decaffeinated green tea extract was further investigated. The caffeinated green tea extract resulted in an increased cancer rate in the flies and the decaffeinated green tea extract resulted in little to no effect on the cancer rate in the flies. The discrepancies within these results may be due to the two different cancer models – eye and colon – that were used. The results from this experiment could be related to humans through analysis of tumorigenic pathways; consequentially impacting human cancer research and treatments.

### **05.03.69 Effects of Coffee Consumption on Drosophila Cancer Models**

**Kingfisher, Christy** *Northeastern State University*

**Ahlander, Joseph** *Northeastern State University*

Coffee is a drink that many people often enjoy with possible effects that few think about. Research has been done in humans and has shown that drinking an average of 4 cups of coffee a day has cut cancer risk by up to 40%. Research of the effects of coffee in *Drosophila* is an area that has not been looked into. To test these effects various concentrations of both caffeinated and decaffeinated coffee were integrated into the diets of *Drosophila* known to be affected with either a cancer of the eye or colon cancer. The cancer rates were analyzed post-diet to see whether a positive effect occurred or not. In the *Drosophila* with eye cancer the rates were shown to decrease up to a certain concentration where after the rates increased. In the colon cancer model of *Drosophila* the coffee had no noticeable difference on the cancer rates. These results can raise questions about the correlation between coffee consumption and cancer rate in humans. Perhaps further research can lead to breakthroughs in the field of oncology and the ever pressing issue of finding the cure for the emperor of all maladies, cancer

### **05.03.71 Foot Assessment on Diabetics on Dialysis**

**Lama,Lakpa** *Other*

**Waters,Megan** *Other*

Diabetes (Type 1 or 2) is the leading cause of renal failure in patients. As a result of this,the degree of neuropathy increases, as does the incidence of foot ulcerations and amputation of the lower extremities. In people with diabetes and receiving dialysis treatment the risk of amputation increases tenfold. Our research suggests that no lower extremity assessment or no proper lower extremity care on a diabetic client can lead to foot injury and other major complications. Research has shown that in a diabetic client on dialysis, assessment and management of lower extremity can help prevent foot ulceration and amputation. Clients should be encouraged to perform daily foot inspection by washing and lubricating the feet, as well as performing an accurate visual assessment by checking between the toes, and assessing pedal pulses.

### **05.03.72 Transgenic Event Analysis by PCR**

**Strain,Ashley** *Northeastern State University*

**Wang,Kevin** *Northeastern State University*

The presence of these marker genes in commercialized transgenic crops has caused considerable public concern about the medical implications of GM food consumption and GM crop cultivation. Methods that will allow the removal of DNA in plants as efficiently as it is inserted have been developed, such as the use of site-specific recombination, transposition and homologous recombination. In this project, we will use PCR technology to detect the deletion efficiency of transgenic plants. We also detect blood-clot gene (Vampire bat salivary plasminogen activator, DSPA $\alpha$ 1) inheritance in T4 plant. The gene is amplified and sequenced. The results demonstrate that the gene is intact after 4 subsequent generations.

### **05.03.73 Transgenic Tobacco Plants Potentially Yield Antithrombotic Enzyme**

**Reese,Joshua** *Northeastern State University*

**Wang,Kevin** *Northeastern State University*

Lumbrokinases (LK) are enzymes found in earthworms that combat thrombosis and promote a healthy circulatory system. Current thrombolytic substances such as tissue plasminogen activator (t-PA) and urokinase (u-PA) are not specific to fibrin, which works alongside platelets to form blood clots, and may cause excessive bleeding. Lumbrokinases target fibrin and do not have any know side effects. LK also possesses the ability to convert plasminogen into plasmin which breaks down fibrin clots. Currently there are 24 known gene sequences responsible for producing the LK protein. Instead of purifying LK directly from worm samples we hypothesize that proteins produced directly from engineered lumbrokinase PI239 genes, transgenically expressed in plants, will produce pure samples without the unwanted contaminants often obtained with worm samples. My project is to clone PI239 the gene (both original and codon-optimized) into plant expression vectors for both transient and stable transformation in tobacco plants to produce LK that remains active.

#### **05.03.74 Cinnamon Oil Nanoemulsions: Formulation, Characterization, Antimicrobial and Antibiofilm Activity Against MRSA and VRSA**

**Craig,Cole** *University of Central Oklahoma*

**Kotturi,Hari** *University of Central Oklahoma*

**Bhargava,Kanika** *University of Central Oklahoma*

Trans-cinnamaldehyde in cinnamon oil has shown to be a powerful antioxidant and an effective antimicrobial agent against an array of microorganisms and their biofilms. However, its application is limited due to high minimum inhibitory concentration (MIC) and insolubility in water. One of the strategies to deal with hydrophobic compounds is by dispersing them as nanoemulsions. Nanoemulsions of cinnamon oil were prepared via ultrasonication at a 5% v/v of oil and surfactant Tween 80 in DI water and sonicated for 20, 30, 40 and 50 mins. Emulsions were characterized for particle size, pH, and stability. Antimicrobial activity of cinnamon oil nanoemulsions was investigated using an alamar blue based broth microdilution assay against seven strains of MRSA, and seven strains of VRSA. MTT assay was used to assess safety of nanoemulsions. Cinnamon oil nanoemulsions prepared by this method exhibited an average particle size of 99.8 nm and average pH of 4.5. Nanoemulsions were stable for more than one month at 37 and 4°C. The nanoemulsions exhibited an MIC of 0.019-0.039 % v/v, and minimum bactericidal concentration (MBC) varied between 0.07-0.15 % v/v. MTT assay showed no effect of cinnamon oil nanoemulsions on cell viability of liver cancer cell lines. Transmission Electron Microscopy images showed antibiofilm effect of nanoemulsions. Cinnamon oil nanoemulsions could offer alternatives to control biofilms of MRSA in hospital, community and food processing settings.

#### **05.03.75 The Effects of Staphylococcus Aureus Biofilm Conditioned Medium on Fibroblast Migration.**

**Kshetri,Pratiksha** *University of Central Oklahoma*

**Brennan,Robert** *University of Central Oklahoma*

**Vaughan,Melville** *University of Central Oklahoma*

Chronic wounds are often characterized by persistent inflammation. These wounds provide a favorable environment for bacteria to establish an infection, which may lead to the formation of a biofilm that can delay the healing process. Although the occurrence of biofilms in chronic wounds is known, the role of these biofilms in chronic wound pathogenesis is still unclear. Chronic wounds may be affected directly by the biofilm or through interaction with secreted products of the biofilm bacteria. Our goal was to investigate the Staphylococcus aureus biofilm extract effects in fibroblast migration in collagen lattice. Cell migration is one of the important aspect of wound healing. Therefore, we hypothesized that the biofilm conditioned medium of S. aureus would affect the migration of fibroblast. We used a nested collagen matrix model to test this hypothesis. Matrices were allowed to contract in the presence or absence of biofilm conditioned medium; after maximum contraction the matrices were placed within an acellular matrix. The total number of cells that were migrated out from the former contracted matrix into the acellular matrix was counted and averaged. In conclusion, fibroblast migration behavior was inhibited by the biofilm conditioned medium. The future goal is to investigate on the mechanism behind the inhibition properties of biofilm conditioned media on fibroblast.



**05.03.76 Flower Morphology (Color) and Bee Visitation at Chasteberry Bushes on the Greek Island of Lesvos (Greece)**

**Barthell,John** *University of Central Oklahoma*

**Klempay,Benjamin** *Other*

**Lim,Irene** *Other*

**Mallula,Maija** *Other*

**Olsen,Alena** *Other*

**Park,Kristen** *Other*

**Silva,Daniela** *Other*

**Gonzalez,Victor** *Other*

**Hranitz,John** *Other*

**Petanidou,Theodora** *Other*

The chasteberry bush is native to the Mediterranean Region, including on the Greek island of Lesvos. This plant species has at least two color morphs hereafter referred to as "blue" and "white". We performed a transplant experiment to assess whether the introduction of differently colored inflorescences from nearby bushes had any impact on the foraging fidelity of bees we observed visiting in situ inflorescences. Twenty paired comparisons were used for each of two bushes. For each pair, one inflorescence served as a control and the other as the treatment by having the introduced inflorescence attached next to it. No significant differences were detected among treatments and controls on either blue or white bushes. Flower visitors observed at the bushes were primarily bees in the families Apidae, Halictidae and Megachilidae and were consistent in taxonomic diversity with previous studies of this species in the region. Mean nectar volume levels were not significantly different between control and treatment inflorescences. While it is difficult to assess how these results relate to individual bee behavior, these findings suggest that floral colors (blue versus white), at the density of one transplanted inflorescence per treatment, do not strongly influence bee foraging behavior. Future work will replicate this study and seek to track individual bee color preferences through mark-recapture studies.

### **05.03.77 HaCaT Cell Response to ATCC 6538 and BA 1707 Staphylococcus aureus Biofilm Conditioned Media**

**Fessler, Jennifer** *University of Central Oklahoma*

Each year millions of people are afflicted with chronic wounds such as diabetic foot ulcers, pressure ulcers, and venous leg ulcers, which in part, contribute to a considerable amount of mortality in the U.S. annually. Recent studies have shown that bacteria may be playing an important role in inhibiting the healing of these wounds. As keratinocytes play an important role in wound healing, various cell and tissue culture models have been utilized to study the relationship between bacteria and wound healing. As transformed keratinocyte cell lines such as HaCaT cells are much easier to work with than primary keratinocyte cell lines such as HEKa cells, the objective of this study is to determine if HaCaT cells respond similarly to HEKa cells when exposed to bacterial products and would serve as a suitable model. HaCaT cells were exposed to products secreted by Staphylococcus aureus strains ATCC 6538 and BA 1707 grown either as biofilms or planktonically. At designated time points supernatants from the exposed HaCaT cells were collected and assayed for levels of Interleukin 8 (IL-8). Preliminary results show that the HaCaT cells are responding to the bacterial products and that the levels of IL-8 production varies depending on the strain of S. aureus.

### **05.03.78 Preservation and Recovery of Penicillium sp. for use in Classroom Demonstrations**

**Powell, Laura** *University of Central Oklahoma*

**Jones, Ralph** *University of Central Oklahoma*

Fungus is commonly used in classrooms to demonstrate various teaching points. The objective of this study is to provide instructors with a cost-effective and time-efficient method of preserving and recovering stock cultures of Penicillium sp., while conserving storage space. Prior studies have been conducted using various combinations of solid medium, cryogenic, and freeze-drying processes. This study will concentrate on utilizing small volumes of liquid media stored for an extended length of time and should provide alternatives for institutions with limited budgets and space, as well as an estimate of the viability of Penicillium sp. when storage conditions are compromised. The fungus used in this study was originally cultured from refrigerated bread and stored in a 1:1 solution of 40% glycerol and commercial Tryptic Soy Broth for 3 years and 4 months. We hypothesize that the most efficient temperature for long-term storage of Penicillium sp. will be -80° C and -25° C for recovery. Preliminary results indicate that storage at -25° C and -80° C is preferred to ensure an adequate recovery, although more testing is necessary.

### **05.03.79 Examination of Cancer Cell Stress Protection by Overexpression of Protein Phosphatase 5**

**Golden,Teresa** *Southeastern Oklahoma State University*

**Maxwell,Matt** *Southeastern Oklahoma State University*

**Love,Casey** *Southeastern Oklahoma State University*

A more complete understanding of the complex signaling pathways that underlie decisions required for cell survival could potentially lead to advances in cancer research. Serine/threonine Protein Phosphatase 5 (PP5) is an enzyme known to have a role in the processing of cellular signals. PP5 has been shown to inhibit Apoptosis Signal-regulating Kinase 1 (ASK-1), influencing whether a cell will undergo apoptosis. It has been observed that the overexpression of PP5 promotes cancer cell survival when the cancer cells are subjected to stress. Overexpression of PP5 has also been observed to reduce the severity of Alzheimer's in affected neuronal cells; however, this overexpression seems to induce apoptosis in healthy human fibroblasts. To further understand PP5's role in influencing cell survival, we have transiently transfected MCF-7 breast cancer cells with PP5 plasmid expression constructs tagged with the fluorescent marker EGFP, and subjected these cells to oxidative stress. Standard molecular and tissue culture techniques were used for this project. Plasmids were purified using a Qiagen midi-purification kit. Transient transfection using Lipofectamine, LTX, and Plus reagent were done to initiate expression of PP5-EGFP constructs in MCF-7 cells. At various intervals, cells were observed using fluorescent microscopy to detect expression of PP5-EGFP. As anticipated, cells transfected with functional PP5 fared better under stress than cells with mutant PP5.

### **05.03.80 The Influence of Body Condition and Onset of Reproduction on the Number of Serial Clutches Produced by Female Collared Lizards**

**McGill,Connor** *University of Central Oklahoma*

**Baird,Troy** *University of Central Oklahoma*

**Telemeco,Rory** *Other*

In some lizards and snakes, females produce multiple successive clutches throughout a protracted reproductive season. Previous studies on female collared lizards at the Arcadia Lake Dam spillway suggested that the amount of energy stored at the beginning of each reproductive season limits the number of clutches that they produce (Telemeco and Baird, 2011). This hypothesis predicts that female body condition before the onset of first egg production should be a strong predictor of the total number of clutches produced annually. However, the length of the activity season may also play an important role in determining the number of annual clutches, because development of each requires adequate time, and last clutches must be laid early enough that hatchlings can grow to a size which promotes their survival over the impending winter. We tested these predictions by determining the number of annual clutches produced by individual females during 14 successive reproductive seasons, over which the onset of reproduction and number of clutch production varied markedly. The number of clutches produced per season increased significantly with earlier onset of first clutch production, whereas neither initial body condition nor female age influenced the total number of clutches produced. These results indicate that time to produce and lay serial clutches such that they hatch early enough for offspring to develop is the primary factor governing the total number of clutches produce annually.

### **05.03.81 Comparisons of Bee Communities in Three Types of Unmanaged Urban Habitats**

**Hranitz,John** *University of Central Oklahoma*

**Silva,Daniela** *University of Central Oklahoma*

**Cakmak,Ibrahim** *University of Central Oklahoma*

**Barthell,John** *University of Central Oklahoma*

**Gonzalez,Victor** *University of Central Oklahoma*

Urban ecology has the potential to advance knowledge of bee foraging dynamics in man-made or modified habitats, which may aid bee conservation efforts as natural habitats become more scarce and fragmented. Green spaces (e.g., undisturbed lots, recreational parks, botanical and zoological gardens) in urban areas provide food and nesting sources for various bee fauna. Our goals were to: (1) assess the bee communities in three unmanaged urban habitats (woody areas, abandoned lots, and open areas) at the Uludağ University campus in Bursa, Turkey and (2) determine if bee diversity related to plant diversity. From June to July 2015, we collected roughly 100 bee species belonging to 28 genera of six families. Our results reveal greater community similarity among communities in grassy habitats versus intermediate and woodland habitats, while grassy habitats had more bee species than either intermediate or woodland habitats. The number of species and Shannon-Weiner Index ( $H'$ ), were predicted by plant diversity (number of species). Evenness was not predicted by plant diversity. Low evenness was associated with samples with moderate numbers of species and  $H'$ . Our results indicate that grassy habitats harbor the greatest bee community diversity and uniformity, so a few grassy habitats should conserve bees effectively. Meanwhile, lower diversity and community similarity of the intermediate and woody habitats suggest greater efforts are needed to conserve bees in these habitats.

### **05.03.82 Producing a Complete Nutritional Diet for Space Exploration by Using Solid Waste Management Techniques**

**Fors-Francis,Kisa** *Tulsa Community College*

**Francis,William** *Tulsa Community College*

**Corbit,Brian** *Tulsa Community College*

Currently, any long term space exploration mission would carry primarily non-renewable food items on board as payload, while also storing a steadily increasing amount of crew waste products to be returned to Earth for disposal. A sustainable system that utilizes crew waste to generate a complete nutritional diet could potentially extend the range and duration of space missions. By maintaining colonies of *Hermetia illucens* (Black Soldier Fly) and *Eisenia hortensis* (European Nightcrawler) a mission crew would be able to bio-convert waste material through a two-stage process, creating a nutrient dense growing media for optimal plant development. By managing colonies of the organisms as micro-livestock, crew members could efficiently produce populations that could be harvested as a source of complete proteins and fats in a fraction of the space required by traditional livestock.

### **05.03.83 Identification of Novel Antimicrobial Proteins from Extreme Halophilic Archaea**

**Kunz,Yuliya** *Northeastern State University*

**Deole,Ratnakar** *Northeastern State University*

Hypersaline environments are inhospitable to life due to their high salt concentration, which is hygroscopic, and causes cell desiccation and death. However, such harsh environments provide a dwelling for certain microorganisms, which have acquired the ability to survive in these conditions. Archaea, Bacteria and Eukarya have evolved to proliferate in hypersaline environments. Studies on biodiversity of hypersaline ecosystems have determined archaea as the most prevalent denizens. Extreme halophilic archaea (haloarchaea) belong to the single Halobacteriaceae family, which thrive in environments with NaCl concentration as high as 1.5-5.0 M. Selective advantage for halophilic archaea in such harsh environment could be due to production of proteinaceous antimicrobials, called halocins. Unlike antimicrobial compounds of bacteria and eukaryotes, halocins have not been well characterized yet. Their antimicrobial properties against the pathogenic microorganisms are still unknown. Therefore, extreme halophilic archaea is an untapped source of novel antimicrobial compounds which could be developed into potential antibiotic medications, possibly aiding in conquering some drug-resistant pathogens. In this project soil samples from the Great Salt Plains, Oklahoma were screened for halocin producing haloarchaea. Isolates showing antimicrobial properties and their halocins were identified and tested using biochemical techniques and molecular biology analyses such as ribotyping and PCR.

### **05.03.84 Completeness of Reporting in Shoulder Arthroplasty: A Systematic Review**

**Howard,Benjamin** *Oklahoma State University*

**Simms,Matthew** *Oklahoma State University*

**Detten,Grant** *Oklahoma State University*

**Detweiler,Byron** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

**Scott,Jared** *Oklahoma State University*

Completeness of reporting is necessary in clinical trials in order to minimize bias and allow for accurate comparison of effects between interventions in shoulder arthroplasty. It's a growing concern that randomized clinical trials are not reporting all of their primary and secondary outcomes or may incompletely report them. This causes a potential for bias and inconsistency among trials and interferes with accurate analysis of results. We analyzed reporting of core outcomes for shoulder arthroplasty to determine whether there was complete reporting. We searched several databases and selected journals that examined core outcomes for total shoulder arthroplasty, reverse shoulder arthroplasty, hemiarthroplasty, and glenoid resurfacing arthroplasty procedures. We evaluated articles based on a pre-established coding criteria and verified our work by comparing coding to the standardized approach. Any discrepancies between coders were discussed and settled by a group consensus. Of 890 reported outcomes across clinical trials that were examined, we tracked which ones were of primary importance, secondary importance, or were not specified. We looked at the proportion of those outcomes that were listed as having side effects, no side effects, or were incomplete in their specification. A majority of the reported outcomes were unspecified or unclear. It was concluded that the reporting of outcomes was incomplete, suggesting the need to improve standardization and report

### **05.03.85 Effects of Age and Estrogen Depletion on Hypothalamic Responses to the $\beta$ - Adrenergic Agonist, Isoproterenol**

**Simsek,Zinar** *Northeastern State University*

**Curtis,Kath** *Oklahoma State University*

Women have increased rates of cardiovascular disease after menopause; however, it is not clear whether this increase is due to age or to postmenopausal loss of estrogen. Our objective was to address this issue in a rat model. We used young and aged ovariectomized (OVX) female rats and focused on the hypothalamic Supraoptic Nucleus (SON), which contributes to blood pressure regulation and body fluid homeostasis via secretion of the hormones vasopressin and oxytocin. Rats: Young and aged female OVX rats were used. Isoproterenol Treatment: Isoproterenol (ISOP; 30  $\mu$ g/kg; young-n=5, aged-n=4) or vehicle (0.15 M NaCl; 750  $\mu$ l/kg; young-n=3, aged-n=3) was injected. Immunohistochemistry: 90 minutes after ISOP or vehicle, rats were deeply anesthetized and then perfused with paraformaldehyde. Brains were removed, sectioned at 40 $\mu$ m, and processed for the protein FOS (Santa Cruz; 1:50,000), a marker of neuronal activation, and the neuropeptide Oxytocin (Chemicon; 1:25,000). Immunolabeling was quantified in the SON. Total FOS immunolabeling in the SON was increased by ISOP in both OVX rats. The increase in neural activation was not selective, as FOS and Oxytocin double-labeling and labeling for FOS only increased after ISOP in both groups. These experiments revealed no effect of age on neural activation in the SON. Thus, changes in blood pressure regulation after menopause may be due to loss of estrogen. Alternatively different central areas may play a larger role in this e

### **05.03.86 Kill Curve Using 293F Human Embryonic Kidney Cells and Preparation for Future Work**

**White,Melinda** *Northeastern State University*

**Fisher,Andrew** *Northeastern State University*

**Atkins,Miko** *Northeastern State University*

**Fischer,Hayley** *Northeastern State University*

**Harris,Kristie** *Northeastern State University*

**George,Reeder** *Northeastern State University*

**Usman,Amna** *Northeastern State University*

**Mcdowell,Dr. Kathi** *Northeastern State University*

Chromosomal abnormalities are the cause of many genetic disorders in humans. Genetic disorders in humans include Down Syndrome. NORs (Nucleolar Organizing Regions) within the chromosome contain tandem repeats of rDNA. NORs that are actively transcribed are responsible for the formation of nucleoli. NORs may interact with each other during interphase leading to satellite associations. Satellite associations may lead to chromosomal abnormalities such as nondisjunction or Robertsonian Translocation; for example Down Syndrome. The aim of this project is to isolate and analyze plasmid DNA for future studies; as well as, determine the concentration at which human cells succumb to Blastidicin. Vector plasmid (pUB/bsd) and rDNA clones (P5, E6, E13) were isolated using Maxi-prep techniques and analyzed. In addition, we set up a Blastidicin kill curve exposing human embryonic kidney cells (293-F) to various concentrations over a 10-14 day period. We were able to conclude that the plasmid E13 was actually E6. Therefore we analyzed additional isolates of E13 and confirmed that they contained the correct E13 plasmid. We also concluded that the minimum amount of Blastidicin required to kill the human embryonic kidney cells is 10  $\mu$ g/ml over 14 days using Freestyle Expression Medium. This preliminary data needs to be repeated.

### **05.03.87 Photothermal Effects of Gold Nanorods in Cancer Studies**

**West,Connor** *University of Central Oklahoma*

**Hasanjee,Aamr** *University of Central Oklahoma*

**Silk,Kegan** *University of Central Oklahoma*

**Lam,Ahn** *University of Central Oklahoma*

**Zhou,Feifan** *University of Central Oklahoma*

**Chen,Wei** *University of Central Oklahoma*

Laser Immunotherapy (LIT) is a novel cancer treatment modality that employs laser irradiation and a powerful immunoadjuvant to evoke a systemic anti-tumor immune response, in order to treat metastatic cancers. To enhance the photothermal effect of the laser irradiation, nanoparticles have been used to absorb laser light energy and convert it into thermal energy. Previously, single-walled carbon nanotubes (SWNTs) have been the preferred nanoparticle, but more recent studies have shown that gold nanorods, which absorb a higher wavelength of light, can penetrate deeper into tissue and heat melanoma cancer cells more efficiently. In this study, gold nanorods were tested for photothermal effects under the irradiation of near-infrared lasers. Their effects were analyzed in gel phantoms, aqueous solutions, and cell cultures. From the data, it was observed that the gold nanorods were more effective in absorbing the laser light and converting it into thermal energy than the previous-used single-walled carbon nanotubes. Our results will contribute to our future studies in the development of nanoparticle-enhanced photothermal therapy for cancer treatment.

### **05.03.88 Experimental Design to Determine the Correlation Between rDNA and Aging Involving Extrachromosomal rDNA Circles in *Saccharomyces cerevisiae***

**George,Reeder** *Northeastern State University*

**Mcdowell,Dr. Kathi** *Northeastern State University*

The rDNA of all eukaryotes is repetitive. This repetitive nature of the rDNA makes it susceptible to losing some of its copies among the repeats. rDNA can extricate itself from the genome forming extrachromosomal rDNA circles (ERC's) that can accumulate inside of a yeast mother cell. This experimental design will help illustrate the correlation between rDNA and aging, involving the ERCs in yeast cells. Origin of replication activity influences the quantity of extrachromosomal rDNA circles believed to enhance senescence (Feser et al., 2011). This design is expected to help elucidate the point at which aging in yeast begins, how ERCs are affected during the process of replication, separation, and visualization of the bands.

### **05.03.89 Investigating Genomic Instability: Conserved Sequences in Mrc1 Involved in the Interaction with Mcm10**

**Fletcher, Jared** *Northeastern State University*

**Kunz, Yuliya** *Northeastern State University*

**Fultz, Brandy** *Northeastern State University*

**Das-Bradoo, Sapna** *Northeastern State University*

Mutations often occur due to mistakes introduced into the genome during DNA replication. Accumulation of such mutations leads to genomic instability, whereas, genomic instability tends to increase predisposition to cancer development. There are numerous checkpoints that monitor genome integrity during DNA replication. Such checkpoints are involved in stabilizing stalled replication forks during stress (DNA damage), and in assembly of DNA repair complexes. Two genome-wide studies identified Mcm10 and Mrc1 as direct contributors in genome stability. Minichromosome maintenance protein 10 (Mcm10) is required for DNA replication initiation and progression. On the other hand, Mediator of replication checkpoint 1 (Mrc1) is a dual function protein that is involved in both DNA replication and in activation of the DNA damage checkpoint pathway. Our laboratory has observed a direct interaction of Mcm10 with Mrc1 in budding yeast. The project was directed towards identifying the exact region on Mrc1 that interacts with Mcm10. For this project, we systematically truncated Mrc1 and ligated the fragments into a two-hybrid vector. The correct ligation was confirmed by DNA sequencing and protein expression was verified via Western blot. Our results successfully identified the location of a conserved region in Mrc1 that directly interacts with Mcm10. Further studies will be performed to determine if specific alterations of this conserved sequence will ultimately lead to genomic instability.

### **05.03.90 Experimental Design: Detecting Alzheimer's Disease Early**

**Fisher, Andrew** *Northeastern State University*

**Mcdowell, Dr. Kathi** *Northeastern State University*

Alzheimer's disease (AD) is a disease that progressively worsens and destroys a person's memory and other mental functions. Traumatic Brain injury (TBI) is a complex injury that occurs to the brain. Though there are many studies trying to find a cure for Alzheimer's, there is not much in the way of detecting it in the earliest stages. Previous studies have identified 12 unique miRNAs that can be used as a source for detecting AD. Can microRNA (miRNA) be isolated and used from the cerebral spinal fluid (CSF) of patients that are genetically at risk and TBI patients in order to detect AD earlier? In this study we plan to isolate CSF from patients who are genetically at risk for AD or have been diagnosed with a TBI and from controls who do not have genetic markers. The miRNAs will be identified and determine if they are one of the 12 unique miRNAs. We expect to find the presence of miRNAs of the genetically predisposed individuals and TBI groups.



### **05.03.91 Growth Curve of Human Embryonic Kidney 293F Cells**

**Fisher,Andrew** *Northeastern State University*

**Mcdowell,Dr. Kathi** *Northeastern State University*

**Fischer,Hayley** *Northeastern State University*

HEK 293 cells have been used since 1973 as a model cell due to their versatility. This line of cells comes from an embryonic human kidney and transformed with sheared human adenovirus type 5 DNA. (F. L. Graham\*, 1977). The aim of this project is to conduct a growth curve of the HEK293 cells needed for future studies; utilizing the HEK293F (suspension) cell line. Cell Density and viability was determined via counting using a hemocytometer. These cells were plated in a 12 well plate using Freestyle 293 Expression medium with Penicillin Streptomycin. The cells were placed in a growth chamber with approximately five percent CO<sub>2</sub> and a humidified atmosphere at 37 °C to grow. A sample of cells from each well of the plate was counted in the presence of Trypan Blue every two to three days to determine cell number and viability. The cells were counted many times. The amount of media that was removed for counting was replaced with fresh media. Cells were split when they reached a cell density of 1x10<sup>6</sup> or greater. When cells reached the desired density a serial dilution was set up at 1:2, 1:4, and 1:8 and growth monitored.

### **05.03.92 Cell Wall Modification Genes and the Promotion of Multicellularity**

**Troupe,Rashid** *Langston University*

A cell wall modification gene of *Gonium* (multicellular) was transformed into *Chlamydomonas* (single-celled) to have a multicellular gain of function. Linking the cell wall modification gene with the RB pathway (cell cycle regulator) of *Gonium* can lead to further experimentation for cancer research. After a long process of selecting a putative multicellular gene, it was transferred into *Chlamydomonas* using the following steps: 1) Amplified the gene by PCR, 2) ran a gel extraction to isolate the specific base pair, 3) ligated that gene to a plasmid vector so that it can be more easily transformed, 4) transformed the gene to *E. coli* to make more copies of the gene for further experimentation, 5) ran a colony PCR to ensure that the gene was still present, 6) grew more plasmids for further experimentation by culturing, 7) ran a restriction enzyme digest to ensure that the gene was in the correct orientation, 8) electroporation. The multicellular genes were successfully transformed into *Chlamydomonas* resulting in *Chlamydomonas* becoming multicellular. Backcrossing of the transformants is the next step of the process to see if the cell wall modification gene is linked with the RB Pathway in search of a suggested understanding of how single-celled algae evolved into multicellular algae. The RB Pathway in algae is similar to that of a human, and understanding how this pathway has modified

### **05.03.93 Mcm10: A Possible Role in DNA Damage Response Pathway**

**Widener,Jeremy** *Northeastern State University*

**Peake,Ian** *Northeastern State University*

**Fultz,Brandy** *Northeastern State University*

**Das-Bradoo,Sapna** *Northeastern State University*

Minichromosome maintenance 10 (Mcm10p) is implicated in eukaryotic DNA initiation and elongation via recruitment of MCM helicase and stabilization of DNA polymerase. Errors in Mcm10 expression have been shown to lead to tumorigenesis. Another key component of the replisome is the replication fork pausing complex, which comprises mediator of replication checkpoint (Mrc1), chromosome segregation in meiosis (Csm3) and topoisomerase 1-interacting factor (Tof1). In the event of replication stress, the pausing complex senses DNA damage and activates the checkpoint kinase that stabilizes the fork and prevents re-replication. Our project is directed towards further understanding the replication checkpoint errors that lead to cell cycle progression and tumors. Previous research in the laboratory has shown that Mcm10 interacts strongly with Mrc1 in yeast. We are specifically looking at Tof1, another component of the pausing complex and its interaction with Mcm10. Tof1 was amplified from *Saccharomyces cerevisiae* and inserted into the pACT2 bacterial vector using PCR, restriction enzyme digestion, and bacterial transformation techniques. Ligation was confirmed by DNA sequencing and protein expression was verified by Western blot. Yeast two-hybrid was performed to determine interaction between Mcm10 and Tof1. Our results confirm that Mcm10 interacts with the pausing complex exclusively through Mrc1 and not Tof1. Future studies are directed towards understanding Mcm10:Mrc1 interaction.

### **05.03.94 Experimental Design of Methylation Patterns in Breast and Ovarian Cancer Diagnosis**

**White,Melinda** *Northeastern State University*

**Mcdowell,Dr. Kathi** *Northeastern State University*

Breast cancer and ovarian cancer are two of the most common cancers in women and are often diagnosed once metastasized. Methylation of the CpG sites in DNA regulate gene expression which keeps genes in the off position. If the CpG sites are hypermethylated or hypomethylated that can cause instability in the genome for cancer to occur or for genes to be turned off like the tumor suppressor gene. This experimental design will use tissue samples from various stages of breast and ovarian cancer as well as corresponding normal tissue to measure the methylation pattern in the genomic DNA by using the EpiTyper assay for quantitative DNA methylation analysis. These experiments are designed to map out the patterns of methylation. This should allow for a diagnosis as to the type of cancer and the stage of the cancer.

### **05.03.95 Developing a Tissue Engineering Scaffold for 3-dimensional (3D) cell culture using an Electrospun Nano-fiber**

**Knight,Joshua** *University of Central Oklahoma*

**Project Summary** This research is to evaluate the effect of architecture on the osseointegration of a scaffold made with Polycaprolactone (PCL) fibers and collagen (CG). PCL fibers will be produced using electrospin process. A technique will be developed to sandwiched PCL fibers with the CG. Cell viability on the PCL-CG scaffold will be evaluated. Images will be taken using a fluorescent light microscope to analyze the ratio of cell adhesion to cell proliferation on the scaffold. **Goals and Objectives** The goal of the research is the in vitro evaluation of the PCL fiber – CG film scaffold to use the scaffold as a tissue engineering scaffold. Aligned and bidirectional PCL nanofiber mesh will be fabricated using electrospinning method and secured with CG film. The objectives of the project are to conduct (1) proliferation and adhesion of osteoblast cells on only PCL scaffold, (2) proliferation and adhesion of osteoblast cells on PCL-CG scaffold, and proliferation and (3) adhesion of osteoblast cells on CG-PCL-CG scaffold. **Impact:** The potential of this research is to improve internal proliferation on the PCL scaffolds. Access the process of electrospinning PCL fibers and the in vitro efficacy of PCL, CG-PCL, and CG-PCL-CG scaffolds. The research is expected to yield considerable benefits in tissue engineering.

### **05.03.96 Effect of Ibuprofen on growth and development of Dictyostelium discoideum**

**Ubeidat,Muatasem** *Southwestern Oklahoma State University*

**Robertson,Ashley** *Southwestern Oklahoma State University*

**Tatah,Canisia** *Southwestern Oklahoma State University*

**Howard,Kristen** *Southwestern Oklahoma State University*

**Nicoll,Paage** *Southwestern Oklahoma State University*

**Eno,Susan** *Southwestern Oklahoma State University*

*Dictyostelium discoideum* is a powerful eukaryotic biomedical model organism to study developmental regulation and cellular signaling because of the ease of genetic, biochemical and cell biology approaches. Upon starvation, single-celled amoebae emit cAMP and migrate toward aggregation centers. This gives rise to a discrete multicellular structure called the "slug". In the migrating slug, the precursors for stalk and spore cells become recognizable and are localized in specific regions. Prestalk cells are located in the anterior 20% of the slug and prespore cells occupy the remainder. The developmental process of this organism depends on environmental and internal signals and can be divided into two phases; the formation of a moving slug from solitary amoeba upon starvation and the switch from a slug to fruiting body that holds the spores, for dispersal, on an aerial stalk. In this study, we are investigating the effect of Ibuprofen on the growth and development of *Dictyostelium*. Ibuprofen is a nonsteroidal anti-inflammatory drug (NSAID). It works by reducing hormones that cause inflammation and pain in the body. When we treated growing *Dictyostelium* cells with different concentrations of Ibuprofen, growth was impacted and delayed as concentration increases. Also, the development of *Dictyostelium* was inhibited. The cells progressed through development but terminated at the tight aggregation stage when 250ug/ml Ibuprofen was used.

### **05.03.97 Improving mRNA stability & translational efficiency: A novel therapeutic strategy in Friedreich Ataxia**

**Tatah,Canisia** *Southwestern Oklahoma State University*

**Roostaeyan,Omid** *University of Oklahoma*

**Chutake,Yogesh** *University of Oklahoma*

**Bidichandani,Sanjay** *Other*

Introduction: Friedreich Ataxia (FRDA) is an autosomal recessive inherited disorder caused by a GAA triplet-repeat expansion in intron 1 of the FXN gene. FRDA patients have abnormally low levels of frataxin protein secondary to deficient FXN transcription, which results in degeneration of the nervous system mainly affecting the spinal cord and heart. Since the genetic mutation is in a noncoding region of the FXN gene, the protein coding sequence is intact. Therefore increasing the transcriptional output, improving transcript stability and/or translational efficiency are attractive therapeutic strategies for FRDA. Hypothesis:The 3' untranslated region (UTR) of a transcript often plays an important role in mediating mRNA stability through cis- and trans-acting regulatory elements. We hypothesized that overexpression of the 3'UTR of the FXN transcript could potentially act as a sponge and deplete negative FXN regulatory elements and thereby improve FXN mRNA stability and / or translational efficiency. Methods:Both major 3'UTRs of the FXN gene were cloned downstream of the tdTomato fluorescent marker and over-expressed in HEK cells. 3'RACE was performed to identify the 3'end of the tdTomato-linked 3'UTRs. Endogenous FXN mRNA levels were measured by qRT-PCR on RNA extracted from transiently transfected HEK cells. Results:By sequencing we showed that FXN 3'UTRs are expressed downstream of tdTomato mRNA. qRT-PCR did not show any change in e

### **05.03.98 Life Cycle Inventory Data Acquisition Methods for Pyrolysis Biofuel**

**Simon,Nicholas** *Langston University*

Life Cycle Assessment (LCA) is an internationally accepted method to examine the inputs and outputs of a product and the effects they have on the environment. LCA can provide different characteristics including global warming potential (GWP) and fossil fuel use. Using GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation), a full life-cycle model funded by the Argonne National Laboratory, outputs for E-10 reformulated gasoline and pyrolysis oil were collected and compared. The outputs are known as Life Cycle Inventory (LCI). The data obtained from GREET took several years to compile through different analysis performed by researchers. This research endeavor details the steps and analysis involved in producing the final product in GREET. Switch grass was obtained and pyrolyzed using the HP/HT Pressure Reactor provided by the Parr Instrument Company. The bio oil and gas generated from the reactor underwent analysis which provided the contents of each. The oil from switchgrass has a strong potential for commercial application as a bio fuel.

### **05.03.99 Developing an Avian Model of Maternal Phenylketonuria**

**Ware,Orgel** *University of Central Oklahoma*

**Guffey,Jordan** *University of Central Oklahoma*

**Brandao,Mariano** *University of Central Oklahoma*

**Seagraves,Nikki** *University of Central Oklahoma*

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], brain and growth restriction when a mother with Phenylketonuria [PKU] does not control her dietary intake of Phenylalanine [Phe]. In this study, we aim to establish and characterize an avian model of MPKU. Based on previous studies in mouse, we sought to determine the dose of Phe required to induce CVMs. METHODS: We investigated the effect of 2 delivery modes and 6 doses of Phe upon avian embryo development. The delivery routes included modified egg windowing, and in-ovo yolk injection of a vehicle or Phe. RESULTS: The modified egg windowing caused significantly higher mortality and morbidity than the in-ovo yolk injection. Phe exposure doses  $\geq 900\mu\text{M}$  caused 100% lethality when injected at HH3. We increased survival significantly in embryos exposed to  $\leq 800\mu\text{M}$  Phe at HH3. Embryos displayed gross morphological changes including developmental and growth delays, anterior and posterior abnormalities, and torsion defects. We were able to significantly increase survival when high doses were injected at HH6-7 FUTURE STUDIES: Histological analysis is underway to determine changes in heart development. Currently there is no data interrogating the mechanism by which Phe causes heart defects. We plan to utilize this model to define the mechanism of Phe cardiac teratogenicity which is critical for improving MPKU treatments and outcomes.

### **05.03.100 Transcriptomic Analysis in an Avian Model of Maternal Phenylketonuria**

**Watson,Jamie** *University of Central Oklahoma*

**Seagraves,Nikki** *University of Central Oklahoma*

Maternal PKU is a disease that affects embryos exposed to high levels of Phenylalanine(PHE) from mothers with PKU. This results in severe cardiac and cranial defects. Currently the only treatment is restricting the mother's diet of PHE. Interestingly, it is not known which genes in the developing embryo are differently expressed in the presence of high PHE. To investigate this, fertilized chicken eggs were treated with 2500uM PHE through yolk injection at HH6. Embryos were incubated until HH14 and then dissected. The brain/head region anterior to the otic placode was isolated separately from the thoracic/cardiac region between the otic placode and the 4th somite. The remaining tissue was discarded. For the control group, 3 embryos were pooled and 2 embryos were used for treated for a total of 3 samples. RNA was isolated using the Norgen Total RNA Isolation Kit, followed by storage at  $-80^{\circ}\text{C}$ . RNA was shipped to a Applied Biological Materials for total PolyA enrichment for mRNA and the library was constructed. Samples were sequenced on the Illumina NextSeq500. Raw FASTQ data were received for further bioinformatics analysis. In our future work, we will analyze the differential gene expression levels using open source software. The reads will be aligned to the annotated reference genome of Gallus Gallus. Data will be analyzed by calculating gene and transcript expression. Differential gene expression between control samples and treated will be identified for further in

### **05.03.101 Analysis of Migration in Phenylalanine Treated Cells**

**Harvey,Kody** *University of Central Oklahoma*

**Thetford,Mary** *University of Central Oklahoma*

**Seagraves,Nikki** *University of Central Oklahoma*

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], brain and growth restriction when a mother with Phenylketonuria [PKU] does not control her dietary intake of Phenylalanine [Phe]. However, the mechanisms responsible for Phe-induced CVMs are poorly understood. Previous studies have shown that cardiac neural crest cells are important in formation of the outflow tract (OFT) and aortic arch arteries (AAA). Cell migration of the neural crest cells is a central process in the development of the heart. Study Objective: Since congenital CVM of the OFT and AAA are often observed in maternal PKU, in this study we aimed to determine if exposure to high Phe levels perturbs cell migration, proliferation, and apoptosis. Methods: We will conduct migration assays on several cell types to determine if migration is affected by Phe. Migration was assessed by classic scratch wound assay and by Silicon elastomeric masks migration study. Additionally, in the human fibroblast cells we stained for markers of proliferation to determine if it was affected by the Phe exposure. Phe doses of 0.9mM, 1.5mM, and 2.5mM will be tested.

### **05.03.102 Neural Crest Cell Migration, Proliferation, and Apoptosis in an Avian Model of Maternal Phenylketonuria**

**Guffey,Jordan** *University of Central Oklahoma*

**Brandao,Mariano** *University of Central Oklahoma*

**Hendricks,Carolyn** *University of Central Oklahoma*

**Seagraves,Nikki** *University of Central Oklahoma*

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], brain and growth restriction when a mother with Phenylketonuria [PKU] does not control her dietary intake of Phenylalanine [Phe]. However, the mechanisms responsible for Phe-induced CVMs are poorly understood. Previous studies have shown that cardiac neural crest cells are important in formation of the outflow tract (OFT) and aortic arch arteries (AAA). Study Objectives We will characterize the migration and differentiation of cNCCs in-vitro chick neural tube explants. The neural tube explant will be placed in a culture dish with a collagen matrix in the absence or presence of Phe (900  $\mu$ M, 1500  $\mu$ M and 2500  $\mu$ M). Each well will contain 3 neural tube explants and the experiment will be repeated in triplicate. The cultures will undergo time-lapse photography to track the migration of the cNCCs. Image J software (NIH) will be used to measure the migration neural crest cells will be quantified comparing non-treated and Phe-treated explants. IHC for HNK-1 to identify neural crest cells, 5-ethynyl-2'-deoxyuridine (EdU) for cell proliferation and activated caspase-3 (p17 fragment) for apoptosis will be conducted.

### **05.03.103 A Novel Interaction between Mcm10 and the Leading Strand DNA Polymerase Epsilon**

**Eddington, Casey** *Northeastern State University*

**Fultz, Brandy** *Northeastern State University*

**Abdelmonem, Mohamed** *Northeastern State University*

**Das-Bradoo, Sapna** *Northeastern State University*

Minichromosome maintenance 10 (Mcm10) and DNA polymerase epsilon (Pol $\epsilon$ ) are essential replication proteins. Mutations in either have been shown to cause genomic instability, a hallmark of cancer cells. Mcm10 is required to facilitate both replication initiation and elongation. Pol $\epsilon$  is critical for replicating the leading strand template during DNA duplication. This polymerase is unique in that it also plays a role in the activation of the S phase checkpoint pathway. Results from our laboratory have shown a strong interaction between Mcm10 and Pol2, the catalytic subunit of Pol $\epsilon$ . Our project attempts to further understand this interaction by determining the exact region on Pol2 that binds to Mcm10. To accomplish this, we have cloned both the N-terminus and C-terminus regions of Pol2 into two-hybrid vectors and observed any possible interactions with Mcm10 via the yeast-two-hybrid method. Surprisingly, Mcm10 exclusively interacted with the C-terminus of Pol2 which harbors the checkpoint domain. It is this C-terminus domain of Pol2 that is essential for cell viability. Currently, we are carrying out experimentation to further zoom into the C-terminus of Pol2. The ultimate goal is to study this interaction under replicative stress and DNA damage conditions, which will give us insight into how mutations in these proteins cause genomic instability. Subsequently, a better understanding of their interactions will provide a possible target for cancer screening and treat

### **05.03.104 Antibiotic resistance of Staphylococcus aureus recovered from Cystic Fibrosis patients**

**Arthur, Wade** *Oklahoma State University*

**Eleshy, Rawan** *Oklahoma State University*

**Lutter, Erika** *Oklahoma State University*

Cystic Fibrosis (CF) is an autosomal recessive condition which is caused by a mutated CFTR. The CFTR protein is located on epithelial cells throughout the human body causing CF to occur in multiple organs. However, symptoms of CF are most commonly seen in the lungs. A mutated CFTR gene leads to dehydration of the lung's airways and also traps mucus inside the lungs. These conditions inside the lung generate a perfect environment for bacterial colonization. Many recent studies that look at the complexity of these infections have suggested that many different types of bacteria persist in the CF lung and acquire antibiotic resistance, which significantly hinders treatment options and drastically impacts patient mortality. Our laboratory has collected many CF patient samples from which the pathogens have been recovered and stored. To better understand how the antibiotics affect the pathogens from CF patients, Kirby-Bauer disc diffusion tests were performed using the recovered CF pathogens. The Kirby-Bauer discs used the *S. aureus* isolates and different antibiotics including Methicillin, Erythromycin, and Kanamycin to look for antibiotic resistance. The results demonstrate that there is a high degree of resistance to multiple antibiotics by *S. aureus* isolates and that the resistance phenotypes vary between patients. Understanding the level of antibiotic resistance of these isolates will give significant insights into future treatment options for these patients.

### **05.03.105 Non-steroidal anti-inflammatory drugs (NSAIDs) stimulate unique fungal isozymes**

**Rowsey, Tyler** *East Central University*

**Biles, Charlie** *East Central University*

Fungi are becoming a greater health concern in home and hospital settings. Some fungi can cause serious systemic infection and all fungal spores and hyphal segments are allergenic. The purpose of this research is to further understand the possible inhibitory mechanisms of non-steroidal anti-inflammatory drugs (NSAIDs) on fungal growth, germination, and reproduction. Previous research has shown that NSAIDs are inhibitory to yeasts, but very little work has been conducted on filamentous fungi. Common indoor molds (fungi) are included in the genera *Aspergillus*, *Fusarium*, *Stachybotrys*, and *Chaetomium*. These fungi were grown in broth media amended with various NSAIDs. The fungi were separated from the broth after 7 days of growth. Proteins were extracted from the proteins. Several Native-PAGE gels were run with fungal protein extracts and stained for general proteins and specific isozymes associated with the glycolytic, tricarboxylic acid, anaerobic, and secondary metabolic pathways in fungi. Results indicated unique protein bands in several isozymes and general protein gels. Future studies will involve purifying the proteins elicited by the NSAIDs.

### **05.03.106 Histological Analysis of Heart Tissue in an Avian Model of Maternal Phenylketonuria**

**Williams, Mandy** *University of Central Oklahoma*

**Seagraves, Nikki** *University of Central Oklahoma*

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], brain and growth restriction when a mother with Phenylketonuria [PKU] does not control her dietary intake of Phenylalanine [Phe]. We have conducted avian embryo experiments and embryos displayed gross morphological changes including developmental and growth delays, anterior and posterior abnormalities, and torsion defects. The aim of the study is to observe the histological changes in the internal tissues of the heart and the OFT vessels in response to high Phe. Whole embryos were fixed in 10% buffered formalin and sent to OMRF for paraffin embedding. We will cut serial sections at 8µm in the transverse plane. The sections will be stained with hematoxylin and eosin (H & E) and examined for internal morphology and CVMs by assessing the cardiac tissue.



### **05.03.107 Defining the Role of a Mutant Isocitrate Dehydrogenase (IDH) in Malignant Gliomas**

**Fields, Joseph-Michael** *Langston University*

Gliomas are the most common primary central nervous system tumor but the molecular mechanisms responsible for the development and progression of these tumors are far from being completely understood. Mutations in the metabolic enzyme isocitrate dehydrogenase (IDH) were recently found in ~80% of WHO grade II-III gliomas and secondary glioblastomas. These mutations inhibit the enzyme's ability to convert isocitrate to  $\alpha$ -ketoglutarate and, instead, confer a novel gain-of-function resulting in the conversion of  $\alpha$ -ketoglutarate to 2-hydroxoglutarate. However, the fundamental mechanism(s) by which these mutations affect glioma cell growth remain unclear. This study aims to further our understanding of the function of mutant IDH using an established brain tumor mouse model. Together, these approaches will lead to a better understanding of the biology of mutant IDH gliomas and will help guide the development of new therapies to improve survival and reduce morbidity in these patients.

### **05.03.108 A Comparative Study of High Fructose Corn Syrup and Sucrose Syrup Fed to Russian and Italian Breeds of *Apis mellifera***

**Hill, Caleb** *Northeastern State University*

**Key, kelsie** *Northeastern State University*

Honeybees are the most important pollinators on the planet. Commercial beekeepers argue constantly over which feed is most beneficial for hive growth, and which breed of honeybee is best for rapid hive growth. We believed that sucrose syrup would be more beneficial for the bees than the high fructose corn syrup (HFCS) because sucrose is a disaccharide sugar and HFCS is a monosaccharide; thus the sucrose would contain more energy/volume than the HFCS. We also believed that Italian honeybees would lead to faster hive growth than Russian honeybees based on researching previous studies. We tested our hypotheses by establishing two Russian hives and three Italian hives on Northeastern State University's Tahlequah campus and feeding them from the spring to the fall of 2015. We fed one Russian hive and one Italian hive sucrose syrup, and one Russian hive and one Italian hive were fed HFCS. The remaining hive was the control to show hive growth without feeding. It was fed sucrose initially to help establish the hive, and feeding was stopped after a month. Hive growth was measured by observing the wax, honey, and brood production on the frames weekly. Results suggest that the sucrose syrup and HFCS were equally effective for hive production. Results for the breed comparison are inconclusive due to one of the Russian hives collapsing.

### **05.03.109 Proteins expression of Chaetomium globosum growth in various salts**

**Shrestha,Sabina** *East Central University*

**Prajapati,Rojina Prajapati** *East Central University*

**KC,Ashmita** *East Central University*

**Biles,Charlie** *East Central University*

Chaetomium globosum is a homothallic fungus in the phylum Ascomycota. C. globosum is commonly found in water-damaged buildings, in plants as an endophyte, and soilborne saprophyte. The hyphae and ascospores can be highly allergic and may cause severe systemic infections. The purpose of these experiments were to determine the effects of different salts on the intracellular and extracellular enzyme activity. Fungal growth was significantly reduced at 1 M salt concentrations compared to 0-100 mM salt concentrations. Extracellular activity of the fungus was measured by using 5 different types of p-nitrophenyl conjugated sugar groups. Results showed that extracellular proteins were significantly less in the 1 M treatments. However, enzyme activity was often enhanced at high salt concentrations. Isoenzymes stained on Native-PAGE gels also indicated different protein expression when compared to water controls.

### **05.03.110 Light regimes influence growth patterns and reproduction of Chaetomium globosum**

**Condry,Kimberly** *East Central University*

**Duncan,Joshua** *East Central University*

**Biles,Charlie** *East Central University*

Chaetomium globosum is a fungus commonly found in water-damaged buildings and was one of the most prevalent fungi associated with damage resulting from the Katrina hurricane. Light plays a major role in growth and reproduction in several organisms and is a major determinant in circadian rhythms of mammals. Chaetomium globosum hyphal plugs were transferred to malt extract agar (MEA) and ME broth. Isolates of C. globosum were exposed to light rhythms; continuous dark, continuous light, 12 h light/12 h dark, 6 h light/18 h dark, and 3 h light/21 h dark. Diameter of growth was measured every 7 days. The number of perithecia were counted after 7, 14, and 21 days. Ascospores were counted after 21 days of incubation. Observation of ring patterns suggesting a change in growth, continual vs. discontinuous, was also observed. Chaetomium globosum was grown in broth culture and placed under the same light regimes. Results indicated that growth was not significantly influenced by different light rhythms, but ascospore and perithecia synthesis was greater in the dark when compared to light treatments. Continuous light had the least number of perithecia and ascospores after 21 days. Ring patterns of fungal growth was evident on the 12 h light/12 h dark, 6 h light/18 h dark, and 3 h light/21 h dark, suggesting that light/dark cycles stimulate a circadian-like rhythm. Future research will involve isolating and identifying proteins and genes stimulated or inhibited by light.

### **05.03.111 Biomechanics of Cardiac C-Looping in an Avian Model of Maternal Phenylketonuria**

**Coy,Devan** *University of Central Oklahoma*

**Seagraves,Nikki** *University of Central Oklahoma*

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], brain and growth restriction when a mother with Phenylketonuria [PKU] does not control her dietary intake of Phenylalanine [Phe]. However, the mechanisms responsible for Phe-induced CVMs are poorly understood. The straight heart tube undergoes looping which is vital to normal development of the heart. Voronov, et al investigated the biomechanics of the initial stages of looping, when the heart bends and rotates into a c-shaped tube (c-looping). Utilizing the methods and results of this study we seek to determine if Phe exposure will affect the biomechanical forces in early cardiac looping in our model of MPKU. Embryos will be incubated to HH5 and whole embryo and area opaca will be dissected. We will utilize DiI labelled iron particles and track them of the surface estimate growth, contraction, and shear. Normal control embryos will be unexposed to Phe while exposed embryos will be exposed to 2500µM of Phe. Embryos will be incubated until HH7-8 and imaging will be conducted at 30 minute increments.

### **05.03.112 Role of Azoreductase Enzymes in Bacillus megaterium**

**Jackson,Imani** *Langston University*

**ABRAHAM,KJOY** *Langston University*

Azoreductase catalyzes a NAD (P) H-dependent reaction in bacteria to metabolize azo dyes to colorless aromatic amines. Some of these are carcinogens and tumor producing agents. Azo dyes are the synthetic dyes used for coloring in the textile, food and pharmaceutical industries. The use of Azo dyes by these industries is harmful to the environment because the liquid waste produced still contains the dye. When the dye passes through municipal waste treatment plants the azo dye is resistant of being broken down. The azo dye which is then discharged into the environment contributes to pollution some azo dyes are carcinogenic, mutagenic and form toxic intermediates. The hypothesis is the presence of the azoreductase enzyme in Bacillus megaterium will enable it to breakdown the azo dye Acid Red. The purpose of this study is to identify the azoreductase gene in B. megaterium and determine its role in biotransformation of the dye. Bioassay experiments with Acid Red showed discoloration of the dye. Work is in progress on analysis of the discolored dye and Genomic DNA extraction. This will be followed by PCR and sequencing of the gene.

**05.03.113 The Microflora Inhabiting Gastrointestinal Tracts of Freshwater Amphipods in the Genus Hyalella**

**Trubitsyn, Denis** *Southwestern Oklahoma State University*

**Kinder, Carlene** *Southwestern Oklahoma State University*

**Dengler, Sarah** *Southwestern Oklahoma State University*

**Hendricks, Lindsey** *Southwestern Oklahoma State University*

**Dhoonmoon, Ashna** *Southwestern Oklahoma State University*

**Youmbi, Sinthia** *Southwestern Oklahoma State University*

**Cothran, Rickey** *Southeastern Oklahoma State University*

The feeding ecology of small, benthic aquatic invertebrates is notoriously difficult to study. Many of these organisms are crustaceans, a clade that is known to contain many omnivorous, opportunistic foragers. We hypothesize that the microflora of gastrointestinal tracts will provide insights into the diets of these difficult to study organisms. Specifically, this project will compare the microflora in the gastrointestinal tracts of *Hyalella* sp. amphipods grown in different resource environments. The identification of microorganisms will be performed by isolating the genomic DNA from the contents of amphipods' gastrointestinal tracts followed by polymerase chain reaction amplification of the bacterial 16S rRNA regions. Once amplified, the DNA fragments will be subjected to sequencing. The bioinformatic analysis will be used to identify the abundance of microbial species that make up the *Hyalella* sp microflora. Our results will provide valuable information on the power of this approach to explore the feeding ecology of benthic, aquatic invertebrates.

**05.03.114 Studies on antibacterial properties of *Raphanus sativus* and *Brassica juncea* Megan Francisco and KJ. Abraham Department of Biology, Langston University, OK**

**Francisco, Megan** *Langston University*

Plants have been known to treat common infectious diseases. Previous research on *Brassica juncea* (Mustard Greens) has successfully tested the use of *B. juncea* subcritical water extract as a food supplement which has the possibility to aid in protection from influenza viral infection. Earlier work on *Raphanus sativus* (Radish) seeds proved that there are two classes of antifungal proteins that inhibit the growth of plant pathogenic fungi and some bacteria. Natural compounds from plants are better for human health and a good substitute for present day antibiotics. Methanol extracts from leaves of *R. sativus* and *B. juncea* were used to test for antibacterial activity against *Escherichia coli*. Results showed that extracts of *B. juncea* inhibited the growth of *E. coli*. This may be due to the presence of phenolic compounds. Tests with *R. sativus* did not show positive results. Further studies including phytochemical analysis of leaves and a comprehensive testing of growth inhibition is needed to identify and characterize the bioactive constituents of the leaf extracts.

**05.03.115 Studies on antibacterial properties of Raphanus sativus and Brassica juncea Megan Francisco and Kj. Abraham Department of Biology, Langston University, OK**

**Francisco,Megan** *Langston University*

Plants have been known to treat common infectious diseases. Previous research on Brassica juncea (Mustard Greens) has successfully tested the use of B. juncea subcritical water extract as a food supplement which has the possibility to aid in protection from influenza viral infection. Earlier work on Raphanus sativus (Radish) seeds proved that there are two classes of antifungal proteins that inhibit the growth of plant pathogenic fungi and some bacteria. Natural compounds from plants are better for human health and a good substitute for present day antibiotics. Methanol extracts from leaves of R. sativus and B. juncea were used to test for antibacterial activity against Escherichia coli. Results showed that extracts of B. juncea inhibited the growth of E.coli. This may be due to the presence of phenolic compounds. Tests with R. sativus did not show positive results. Further studies including phytochemical analysis of leaves and a comprehensive testing of growth inhibition is needed to identify and characterize the bioactive constituents of the leaf extracts.

**05.03.116 Molecular Correlation of Rickettsial Disease in Symptomatic Canines**

**Garcia,Alfredo** *Northeastern State University*

**Kirk,Dianne** *Northeastern State University*

**Ruskoski,Sallie** *Northeastern State University*

Rickettsia rickettsii is a gram-negative bacteria responsible for causing Rocky Mountain spotted fever in infected mammals. The American dog tick, Rocky Mountain wood tick, and Brown dog tick are the primary hosts for the bacteria. The purpose of this study was to evaluate exposure to Rickettsia spp in Northeast Oklahoma canines currently exhibiting tick-borne disease symptoms such as fever, lethargy, anorexia, and depression. Blood was collected from 63 canines exhibiting tick-borne disease symptoms between September of 2014 and August of 2015, from local veterinary hospitals. Sera were tested for antibodies to R. rickettsii using an immunofluorescent antibody assay (IFA). DNA from EDTA-treated whole blood from positive IFA animals was extracted and end-point polymerase chain reaction (PCR) was employed to confirm the presence of the organism. The 2014 canine antibody testing revealed 20 of 38(53%) symptomatic canines were positive for IFA compared to 14 of 25(56%) positive canines in 2015. All positive IFA specimens were evaluated using PCR. In 2014 19 out of 20(95%) canines that were IFA positive confirmed positive for Rickettsia spp spotted fever group (SFG) ompA gene. The 2015 specimens exhibited 11 out of 14(79%) molecular correlation. Overall in 2014, 50% of symptomatic dogs were positive for Rickettsia spp, while in 2015 44% were confirmed positive. This data suggests that approximately 50% of canines that are symptomatic may be positive for rickettsial infections.

### **05.03.117 Determining the Interaction Between CT228 and MYPT1 in Chlamydia trachomatis**

**Romine,Brooke** *Oklahoma State University*

**Behar,Amanda** *Oklahoma State University*

**Lutter,Erika** *Oklahoma State University*

Chlamydia trachomatis is a human pathogen responsible for an array of diseases with a substantial medical impact. C. trachomatis infections are the most commonly reported bacterial sexually transmitted infections, with 3 million cases estimated annually in the United States. Despite the longevity of health concerns, there are still fundamental gaps in our understanding of Chlamydia pathogenesis, specifically in regard to the mechanisms used to manipulate host proteins for intracellular survival and growth. One of the host proteins identified to be recruited during infection is myosin phosphatase, which is a host protein known to regulate myosin. This interaction is highly significant since changes in myosin regulation are critical for the development and proliferation of cancer cells. Chlamydia is the first bacterial pathogen identified to manipulate myosin phosphatase during infection, and does so via the chlamydial protein CT228. Our central hypothesis is that truncations in CT228 will be deficient in interacting with MYPT1 in a yeast-two hybrid system. Three CT228 truncations were generated with each truncation removing 10 amino acids from the end of CT228. Using a yeast-two hybrid system, the CT228 truncations (bait) and MYPT1 (prey) were transformed into yeast and assessed for interaction by using restrictive media. Understanding the interaction between CT228 and MYPT1 may shed notable insights into how a Chlamydia infection leads to increased rates of cervical cancer.

**05.03.118 Construction of an Efficient Expression System for Functional Analysis of the Magnetosome Protein Mad2 From *Desulfovibrio magneticus* RS-1**

**Trubitsyn, Denis** *Southwestern Oklahoma State University*

**Burke, Bradley** *Southwestern Oklahoma State University*

**Kessler, Emily** *Southwestern Oklahoma State University*

**Earl, Mazie** *Southwestern Oklahoma State University*

**Kinder, Carlene** *Southwestern Oklahoma State University*

**Dengler, Sarah** *Southwestern Oklahoma State University*

Magnetotactic bacteria (MTB) is a diverse group of prokaryotic organisms which produce magnetosomes, intracellular magnetic nanocrystals surrounded by a lipid membrane. MTB navigate layers of aquatic sediments by orienting themselves with the Earth's magnetic fields using chains of magnetosomes similar to a compass needle. The goal of this study is to investigate the role of the magnetosome protein Mad2 from *Desulfovibrio magneticus* strain RS-1 in crystal morphology by expressing it in *Escherichia coli* followed by analysis of its iron binding properties and effect on crystal formation in vitro. Previously, we established that high levels of Mad2 are toxic to *E. coli*. This project's specific aim is to remove toxicity of Mad2 and isolate it in amounts sufficient for further analysis. A glutathione S-transferase (GST) gene will be amplified and cloned upstream of mad2 on the expression vector. We hypothesize that constructed GST-Mad2 fusion should have less toxic effect due to decreased affinity for the *E. coli* cytoplasmic membrane as well as increase solubility of the overexpressed protein. The GST tag can later be used for protein purification, and will be removed with a protease to allow investigation of the function of the native form of Mad2. This project will improve our understanding of the process of magnetosome formation, and will help to overcome difficulties in commercial production of magnetosomes which have many biotechnological and biomedical applications.

**05.03.119 Increased Maternal Age and Deficiencies in Condensin Leads to Errors during Meiosis**

**Harris, Kristie** *Northeastern State University*

Condensins are dynamic, multi-subunit proteins that contribute to gene regulation, recombination, and repair of meiotic chromosomes. Studies using *Saccharomyces cerevisiae* show condensin proteins are vital for chromosome compaction, synaptonemal complex assembly, and homologous pairing. In addition, studies with *Caenorhabditis elegans* shows condensin I maintains the structure of chromosomes by regulating crossover events and distribution of chromosomes. A deficiency of these pentameric machines affects the segregation of homologous chromosomes during metaphase I. Delays in the assembly of the synaptonemal complex of *Drosophila melanogaster* is related to mutations in the condensin sub-units. During this experiment, we are using *Drosophila melanogaster* to study the process of homologue pairing and condensin loading. Mutations in the condensin subunits results in a delay in the breakdown of the synaptonemal complex; thus, increases pairing in homologous chromosomes.

**05.03.120 Risk of Bias Assessments in Ophthalmology Systematic Reviews and Meta-Analyses**

**Goerke,Kale** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

**Russell,George** *Oklahoma State University*

Importance: The inclusion of low-quality or high risk of bias primary studies in a systematic review provides less confidence regarding the efficacy of a treatment, influences guidelines advocating its use and, therefore impairs the clinician's ability to make sound judgements regarding treatment. Objective: To examine the application of methodological quality and risk of bias appraisal instruments in 282 systematic reviews and meta-analyses in ophthalmology research. Setting: Journals were selected from the highest 2014 h5-index of Google Scholar Metrics: Ophthalmology subcategory. With the inclusion of seven journals, our sampling is representative of the ophthalmology literature. Participants: Our PubMed search generated 282 articles. After review, 100 articles did not meet the inclusion criteria and were eliminated from the analysis resulting in a total of 182 primary articles included in our study. Main Outcome and Measure(s): We determined the degree to which systematic review authors reported evaluations of risk of bias or methodological quality, the methods used, and how outcomes of these evaluations were used in decision making. Results: 47.80% (87/182) of included reviews reported the assessment of methodological quality and risk of bias. Of the 87 reviews reporting assessment of MQ/ROB, only 13.8% (12/87) explicitly stated that low MQ/high ROB studies were excluded from their review while 65.5% (57/87) included articles with

**05.03.121 Title: Yeast-two hybrid analysis of Chlamydia trachomatis type III secreted effector proteins**

**Fleming,Jordan** *Oklahoma State University*

Chlamydia trachomatis is a very well-known sexually transmitted infection that affects millions of people on an annual basis. As an obligate intracellular pathogen it requires the host cell for survival and uses up all of the host cell's resources. After Chlamydia gains entry into the host cell it begins to secrete proteins, called effector proteins, through a type III secretion system that interact with yet undermined host cell proteins. Some of these proteins will insert themselves into the inclusion membrane, while others will be secreted into the host cell environment. To date, little is known about what these secreted effectors do and what host proteins they interact with during an infection. To help determine the role of these secreted effectors, the corresponding Chlamydial genes were cloned into Yeast-two hybrid bait vectors, transformed into yeast and screened against a HeLa cDNA library for interacting partners. Positive clones that interact with the bait proteins have been identified and current efforts focus on sequencing the interacting prey vectors to identify potential host proteins that are targeted by these Chlamydial effector proteins.



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**05.03.123 Experiment Design of the Regulation of GATA1 Levels in Cell Culture Comparing Normal Human Cells and a Cell Line Derived From an Individual With Down Syndrome**

**Fischer, Hayley** *Northeastern State University*

**Mcdowell, Dr. Kathi** *Northeastern State University*

Down Syndrome (DS) is the most frequent human trisomy occurring in 1 in 700 births. Down Syndrome, known as Trisomy 21, has three copies of chromosome 21. Robertsonian translocation, along with meiosis 1 or 2 nondisjunction, can cause DS. DS is associated with a sequence of phenotypic characteristics including mental retardation, dysmorphic facie and wrinkled skin. Having an extra copy of a chromosome can have negative consequences leading to a DS patient developing multiple forms of leukemia known as transient leukemia, acute non-lymphocytic leukemia, acute megakaryoblastic leukemia, and B-cell acute lymphoblastic leukemia. Chronic oxidative injury to the brain can be a factor for neurodegeneration in DS patients. Oxidative stress is caused by an over expression of GATA1 genes encoded by chromosome 21. With accelerated aging pathological malfunctions lead to the development of Alzheimer's-like dementia (AD). Oxidative stress is considered to be a connection between DS and AD. This study will compare GATA1 levels from a normal human cell line and a cell line derived from a DS individual. This study will utilize flow cytometry, micro-array real time PCR, western blot analysis, and chromatin immunoprecipitation assay. It would be expected cells from a DS individual would have lower GATA1 levels. This would be similar to an experiment performed by Xavier et al, 2011.

**05.03.124 The Importance of Ecology in Understanding Sexual Conflict: can Predators Scare Amphipods and Affect Sexual Conflict Over Mate Guarding?**

**Cothran,Rickey** *Southwestern Oklahoma State University*

**Youmbi,Sinthia** *Southwestern Oklahoma State University*

Sexual conflict is a situation where one sex negatively affects the fitness of the other sex. It has been proposed that the environment (e.g. predators, food availability, and competition) can affect the sexual conflict; however, this area of ecology has not received much attention. Predation can significantly affect sexual conflict by changing the behavior of individuals as they avoid being detected by predators. The presence of predators may cause females to be more or less resistant to mating, thus increasing or decreasing sexual conflict. We are studying the effects of dragonfly predators on sexual conflict over precopulatory mate guarding (PCMG) duration in amphipods (*Hyalella* sp.). Females prefer shorter PCMG durations than males. We will test how the presence of predators affects sexual conflict in amphipods by exposing small populations to one of two treatments: with predator cues or without. The number of encounters between the sexes and the number of PCMG pairs will be recorded. If predator cues cause a decrease in amphipod activity, sexual conflict will decrease because females will receive less harassment from males. As a result, we will observe fewer PCMG pairs. However, the presence of dragonflies may increase the "value" of PCMG to females because pairs are less likely to be eaten by dragonflies than single individuals. In this case, we might expect longer PCMG durations. Results will provide insights into how ecology affects the outcome of sexual conflict.

**05.03.125 Cost of Courtship: Effect of Male-male Competition on Harm Experienced by Females in *Hyalella* Amphipods**

**Cothran,Rickey** *Southwestern Oklahoma State University*

**Dhoonmoon,Ashna** *Southwestern Oklahoma State University*

Sexual conflict over mating is common because males and females often have clashing interests over whether, when, how often and for how long to mate. This may result in significant costs to females, which can have negative consequences on populations. We hypothesized that females are more harassed and thus harmed in more densely populated areas. We also hypothesized that females would be harassed more in populations with male-biased sex ratios. In *Hyalella* amphipods, there is sexual conflict over the duration of pre-copulatory mate guarding. Males prefer to pair for a longer period than females. We set up populations of amphipods that differed in the relative proportion of the two sexes: 20% male (female biased), 40% male (typical sex ratio in nature), or 60% male (male biased). Separately, we also varied the size of the container to manipulate amphipod density. We predicted that female survival would decrease as the percentage of males and the density of the population increased. Female survival was ~65% lower in male-biased populations compared to female-biased populations. Contrary to our predictions, females survived better at the higher of the two densities. As number of females in a population decreases, the population has less genetic diversity and hence a greater risk of local extinction. It can be concluded that sexual conflict has a negative effect on population health.

### **05.03.126 Sublethal Effects of Malathion on Amphipod Life History Traits**

**Cothran,Rickey** *Southwestern Oklahoma State University*

**Hendricks,Lindsey** *Southwestern Oklahoma State University*

Understanding the sublethal effects of pesticides is critical because most pesticides are found in low concentrations in nature. Sublethal effects (i.e. effects that do harm to organisms, but do not kill them) have been understudied. I am exploring the sublethal effects of malathion on life history traits of *Hyalella* amphipods. Amphipods collected from two populations in western Oklahoma will be exposed to one of three concentrations of malathion: a no malathion control (0 µg/L), a relatively low sublethal concentration (0.005 µg/L), and a relatively high sublethal concentration (0.02 µg/L). Amphipods that have just reached maturity will be chosen for the experiment and monitored for the entirety of their adult lifespan. For both sexes, I will measure growth rate. For each female, I will also record the number of offspring produced over her lifetime to measure lifetime reproductive success. For males, I will also measure the growth of the posterior gnathopod (a claw-like appendage), which is a sexually selected trait. I predict that the amphipods in the high concentration treatment will have slower growth rates, lower lifetime reproductive success, and smaller claws than those exposed to lower concentrations of malathion. If malathion negatively affects amphipod life history traits, there may be problems in the community they live in because they play important roles as grazers, detritivores, and prey in freshwater ecosystems.

### **05.03.127 The Effect of Molybdophyllysin on Cancer Cells**

**Bowen,John** *University of Central Oklahoma*

**Sawyer,Elaine** *University of Central Oklahoma*

**Ward,Abigail** *University of Central Oklahoma*

**Ovrebo,Clark** *University of Central Oklahoma*

**New,Dallas** *University of Central Oklahoma*

**Kotturi,Hari** *University of Central Oklahoma*

*Chlorophyllum molybdites* is a poisonous mushroom that is found throughout North America. It is the most commonly ingested poisonous mushroom, causing diarrhea and vomiting. We have prepared EtOH extract of the fresh fruit bodies of *C. molybdites*. Our goal is to analyze different fractions of our EtOH extract using HPLC, GC-MS and compare our results with the published values. We also plan to extract Molybdophyllysin, a toxic fungal protein, using chromatography separation technique described by Shiyu Li et al (2013). We would be testing the cytotoxic effect of Molybdophyllysin on HCT116 colon cancer cells and Huh7 liver cancer cells. We hypothesize that the *C. molybdites* extract would inhibit the growth of cancer cell lines.

### **05.03.128 Green Tea Extract Compound Inhibits Dupuytren's Myofibroblast Migration**

**Gainer, Sonnie** *University of Central Oklahoma*

**Stephen, Olivia** *University of Central Oklahoma*

**Vaughan, Melville** *University of Central Oklahoma*

Dupuytren's contracture is a disease where excess tissue forms in the hand, preventing full extension of one or more fingers. A temporary relief exists in the form of surgical removal, but recurrence likely remains. Myofibroblasts are specialized wound healing cells that influence scarring in Dupuytren's and similar diseases. Epigallocatechin Gallate (EGCG) is an antioxidant extracted from Green Tea. Our prediction was EGCG, like other antioxidants, would inhibit myofibroblast migration, therefore inhibiting scarring. We used 2D plug assays to observe the migration rate. The results showed that adding EGCG to cells inhibits the average distance the Dupuytren's cells migrated in three days. Using similar variables, the average migration rate is being tested in a 3D nested matrix assay. To mimic cell's natural environment, Dupuytren's myofibroblasts are assembled into a lattice, contracted, and then placed into a 3D acellular collagen matrix. Cells migrate from the contracted lattice into the acellular collagen matrix. The matrices are photographed daily, and the data is analyzed using ImageJ. The current nested matrix results are consistent with those of the plug assay by showing migratory inhibition with the addition of EGCG. This means that EGCG can be added to the growing list of antioxidants that have potential for Dupuytren's therapy.

### **05.03.129 The Effects of Behavioral and Morphological Traits on the Outcome of Male-Male Contests in Limia Perugiae**

**Murphree, Jessica** *University of Oklahoma*

**Fleming, Parker** *University of Oklahoma*

Male competition is common when resources such as food, territory, or mates are limited. The outcomes of these contests are determined by the male's phenotype. We hope to understand how two major aspects of the male phenotype (morphology and behavior) affect male-male contests in *Limia perugiae*, a live bearing fish (Poeciliidae) native to the island of Hispaniola. Our goals are twofold: First, we establish the relationship between male traits (body size, body shape and coloration) and male aggression (biting, displays and chasing). Second, we determine the outcome of male-male contests when the opponents differ greatly in their traits vs. those who are similarly matched. We accomplished these goals by employing behavioral trials, which measured male aggression toward randomly chosen males. In addition, morphological data was collected from digital images (body size and shape) and spectrophotometry (color measurement). Our results suggest a strong correlation between morphology and aggressive behavior in these fish.

**05.03.130 Helminth Detection in the Loggerhead Sea Turtle (*Caretta caretta*) Utilizing the Apacor Parasep® SF Fecal Analysis System: Implications for the Diagnosis of Cryptic and Emergent Parasites.**

**Prim,Alexa** *University of Central Oklahoma*

**Bliss,Kristen** *University of Central Oklahoma*

**Lord,Wayne** *University of Central Oklahoma*

Fecal analyses are a standard, non-invasive methodology employed in the detection of parasitic infections. New recovery and examination techniques, targeted at improving diagnostic sensitivity and reliability, are a constant pursuit in both medical and veterinary parasitology. Accurate detection of emerging, cryptic parasitemias can be crucial to protection and conservation efforts in threatened and endangered species. Our study focuses on the detection of helminth parasites in Loggerhead sea turtles (*Caretta caretta*) utilizing a new fecal concentration methodology: the Apacor Parasep® Fecal Concentrator. Loggerhead sea turtles represent valued, centennial maritime species, often used as an indicator of environmental quality and health. Our research specifically targets the detection of novel, emergent helminth parasites that frequently avoid diagnosis due to very low intensities. The Parasep® technique is a cost-effective tool that has the ability to detect intestinal parasites otherwise missed using classical methods of fecal concentration. Multiple Loggerhead fecal samples were obtained from NOAA and were concentrated using the Parasep® system. Concentrated samples were subsequently analyzed via direct microscopy. Our technique detected infection with the trematode *Cymatocarpus solearis* at a very low intensity. Parasep® has the potential to greatly improve fecal analysis sensitivity and reliability in wildlife, veterinary, and human clinical parasitology.

**05.03.131 Kill Curve Experiment comparing Differing Doses From Two Blastocidin Batches on 293-F Human Embryonic Kidney Cells In Order To Perform Future Transfection Experiments**

**Fischer,Hayley** *Northeastern State University*

**Fisher,Andrew** *Northeastern State University*

**Mcdowell,Dr. Kathi** *Northeastern State University*

Human Embryonic Kidney cells (HEK 293) are specific fibroblast cell lines grown in tissue culture. The 293-F strain is a suspension cell line that's easy to grow and used in experiments such as a kill curve. A kill curve is an experiment in which cells are exposed to increasing doses of antibiotic to determine the minimal concentration needed to kill all cells over a span of one to two weeks. The aim of this project is to determine the lowest concentration at which 293-F cells succumb to blastocidin. Blastocidin is an antibiotic that prevents growth of both eukaryotic and prokaryotic cells by inhibiting termination step of translocation and peptide bond formation by the ribosome. Therefore cells can no longer produce proteins through translation. This project is a repeat of the experiment done in fall semester 2015 to overcome technical difficulties. A blastocidin kill curve was set up exposing 293-F cells to 0µg/ml, 2.5µg/ml, 5µg/ml and 10µg/ml concentrations over a 10-14 day period. In addition, this experiment compared two different batches of blastocidin: a 2014 and a 2016 tube. The results demonstrated both batches of blastocidin killed all cells in 2.5µg/ml, 5µg/ml and 10µg/ml by day 11. The results indicated that the 2016 blastocidin helped the cells succumb at a faster rate but ultimately the last cells die on day 11. Therefore 2.5µg/ml of blastocidin will be used for future transfection experiments.

### **05.03.132 Effects of Total Abundance on Patterns of Commonness and Rarity**

**Hillis,Nathan** *University of Central Oklahoma*

**Butler,Chris** *University of Central Oklahoma*

The relationship between common and rare species is one of the most prevalent relationships found in nature. In the majority of communities, there are few species with high abundances and many species have low abundances. This relationship is known as the species abundance distribution (SAD). The effects of different levels of abundance on the SAD have not been well studied. This study uses Christmas Bird Count data from 1963 to 2012 for the grasslands of North America to examine how the SAD responds to various scales of abundance. For this project, random fractioning models were developed to predict the SAD based on the total abundance and number of species present in a sample. The observed SADs will be compared to the predicted SADs to determine how the SAD responds to different levels of abundance. Based on earlier studies, we predict that the SAD will move from log-series to lognormal to log-series as the total abundance of the sample increases.

### **05.03.133 Road mortality of turtles: a comparison between highway, rural, suburban and urban areas**

**Petrilla,Ariel** *University of Central Oklahoma*

As fragmentation due to human encroachment into wild lands continues, monitoring populations of wildlife is critical if we are to make management decisions in conservation biology. Because of low hatchling survival, slow recruitment into breeding populations, and delayed sexual maturity, turtles are highly susceptible to increases in mortality and have been extirpated from many areas. In Oklahoma, because of urbanization and associated increases in roads and traffic, areas that once supported robust turtle populations may now be experiencing declines in turtle abundance. I sampled four sets of sites (highway, rural, suburban, and urban) during May-July 2015 making a total of 7 trips that resulted in 135 individuals of 8 species. More individuals were found on highways and in rural areas and more females were found than males for all species present. For all species, 92 individuals (n=74 dead, n=18 alive) were located on highways connecting sampling sites. More individuals were present at rural sites (n=33) compared to suburban (n=6) or urban (n=4) sites. Excluding highways, more live turtles (n=35) were found than dead turtles (n=8), but all live turtles found in suburban and urban locations (n=8) had recent or past physical trauma while few live turtles in rural locations (n=27) showed such signs. Long term goals include further data analysis, habitat analysis, and repeated trips to the same sites during summer 2016 to give a better understanding of seasonal movements.

### 05.03.134 **Systematic ID biases in citizen science, and implications in research databases.**

**Grzybowski, Jospheh** *University of Central Oklahoma*

Citizen science is the collection of data by members of the general public that can be used to assess various dimensions of avian population dynamics and distribution. It includes such efforts as Christmas Bird Counts begun in the early 1900s, and expanded to Breeding Bird Surveys, atlasing, etc. Ornithologists mining such data recognize that errors will be embedded, but operate under general assumptions that this “noise” is low relative to the biological patterns depicted. EBird only came on the scene in 2002, but its data of individual checklists can be used to examine the presence and effects of one issue— systematic ID biases, and their potential influence on biological patterns. Specifically here, I examined data on spring departure dates of a common species, the Song Sparrow (*Melospiza melodia*) from Oklahoma and Texas. This perceived departure overlaps with migrations of other similar sparrow species, in particular Lincoln’s Sparrow (*M. lincolnii*) creating the potential for ID biases. ID biases in this group occur because of focus on single character ID, but also observer exposure to each species reflected by observer zipcode—in-state or out-of-state. Out-of-state observers from areas where Lincoln’s Sparrows are rare relative to Song Sparrows have a substantially higher chance (~0.7) of recording their ID bias than Texas observers, although Texas observers are not without bias (~0.3). This bias involved hundreds of observations

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **04. Botany**

##### **05.04.01 Review of “Sub1A is an ethylene-response-factor-like gene that confers submergence tolerance to rice”**

**Kidd,Shaman** *Northeastern State University*

**Wang,Kevin** *Northeastern State University*

When crops of *Oryza sativa* are completely submerged under water, most of the cultivars in the crops planted in China die out within a few days to a week. This has cost the rice industry in China over a billion US dollars every year. There are a few cultivars that can handle being completely submerged under water for up to two weeks and still survive, one example being *O. sativa* ssp. *indica* FR13A. This submergence resistance stems from a locus referred to as Submergence 1 (Sub1) found on chromosome 9. There are a group of 3 genes in this locus that contain ethylene response factors. They refer to them as Sub1A, Sub1B, and Sub1C, and while Sub1B and Sub1C were found in all rice cultivars that were analyzed, Sub1A was not always found. A survey was done finding there are also two alleles for Sub1A, a tolerance-specific allele and an intolerance-specific allele referred to as Sub1A-1 and Sub1A-2, respectively. Marker-assisted selection was then used to insert the Sub1 locus from the FR13A into a commonly used strain of rice used in Asia that is known for producing a high yield of rice and a pleasant taste, among other qualities. The goal of this is to produce a cultivar of rice that would be resistant to flooding and saving the rice industry time and money.



#### **05.04.02 Floristic Quality Versus Taxonomic Distinctness for Wetland Condition Assessment**

**Jog,Suneeti** *Northeastern State University*

**Green,Jana** *Northeastern State University*

**Bried,Jason** *Oklahoma State University*

Indices of floristic quality and taxonomic distinctness are potentially useful for site monitoring and evaluation. Floristic quality assessment is based on species tolerance to anthropogenic disturbance, whereas taxonomic distinctness is based on the degree of species relatedness. Floristic quality assessment is well established whereas the taxonomic distinctness assessment has not, to our knowledge, been tested for wetland vegetation in North America. Our objective was to determine which approach, floristic quality (FQ) or taxonomic distinctness (TD), provides a better indicator of general wetland condition. We compared FQ indices and TD indices using 108 non-forested wetlands in Oklahoma and analyzed all indices with respect to disturbance categories and a disturbance gradient using randomization tests and linear mixed models. In the categorical analysis, FQ indices differentiated minimally altered wetlands from intermediate and highly altered, whereas TD indices differentiated highly altered wetlands from intermediate and minimally altered. In the gradient analysis, both approaches showed a weak to moderate relationship with disturbance after controlling for natural environmental factors (ecoregion, precipitation, etc.). These results suggest that (1) both approaches (FQ and TD) may be needed to assess the full range of wetland condition, and (2) gradient-based condition assessments may be difficult (at least in Oklahoma) unless background environmental factors are account

#### **05.04.03 Localization and Structure of Plastidial-Encoded Polymerase Sub-units**

**Guerrero Criado,Andres** *Oklahoma State University*

Chloroplast biogenesis is a quintessential process within the realm of plant biology. The path towards chloroplast biogenesis begins with the inhibition of skotomorphogenesis, followed by photomorphogenesis through red light sensing ultimately leading to the initiation of chloroplast biogenesis. We have observed that plants do not develop properly and show an albino phenotype (lacking chloroplast) when chloroplast biogenesis does not occur. Previous experiments have shown that a complex dubbed Plastid Encoded Polymerase (PEP) interacting with Polymerase Associated Proteins (PAP) is the major player in setting a functional chloroplast. Given the semi-autonomous nature of the chloroplast genome, it is established that a cross-talk must occur with the nuclear genome. The white phenotype is observed with the genetic excision of any single PAP, indicating that the whole complex is no longer able to form or function. Interestingly both a chloroplastic-transit peptide and a nuclear localization signal have been predicted within the sequences of certain PAP proteins. To validate these predictions and gain insight on the role of selected PAP proteins within the messaging system, I have chosen to pursue the subcellular localization and protein-protein interactions of these essential proteins. Moreover structural characterization will help us understand the function of each of these proteins within the PEP/PAP complex.

## **Abstracts from the 2016 Oklahoma Research Day**

**Held at Northeastern State University**

### **05. Mathematics and Science**

#### **05. Chemistry**

##### **05.05.01 Analysis of dibutyl phthalate, a possible endocrine disruptor, in infant formula.**

**Bowen, John** *University of Central Oklahoma*

**Lewis, Dalton** *Other*

We will discuss the quantitation of dibutyl phthalate, a suspected endocrine disruptor and common plasticizer, using Solid Phase Microextraction (SPME) and Gas Chromatography Mass Spectrometry (GC MS). Though this compound is apparently banned in the US, we were able to identify and quantitate it in infant formula using an internal standard.

##### **05.05.02 Synthesis and use of reduced graphing oxide to sparge low level contaminants from drinking water.**

**Bowen, John** *University of Central Oklahoma*

**Chapman, Tye** *University of Central Oklahoma*

The synthesis and use of reduced graphine oxide, a particle of graphing oxide with the surface reduced to graphing, is known as a high capacity adsorbent of chemicals in water. The ability of this compound to extract dibutyl phthalate from drinking water will be addressed using solid phase micro extraction (SPME) analyzed by gas chromatography-mass spectroscopy (GCMS).

##### **05.05.04 Analysis of bacterial odors from several strains of methicillin resistant S. aureus (MRSA) and non resistant S. aureus and other bacteria using solid phase micro extraction (SPME) and GCMS**

**Bowen, John** *University of Central Oklahoma*

**Dressler, Garrett** *University of Central Oklahoma*

Odors from the selected strains of S. aureus from methicillin resistant strains and non resistant strains are presented as well as those of other genera will be presented.

**05.05.05 Development of an analytical method and quantitation of glyphosate in Oklahoma surface waters.**

**Bowen,John** *University of Central Oklahoma*

**Colby,Devon** *Other*

A method for the extraction and derivitization of glyphosate for its quantitation using gas chromatography mass spectrometry (GC MS) will be discussed.

**05.05.06 Analytical method for the determination of stress in university students using the analysis of zinc in hair and cortisol in saliva.**

**Bowen,John** *University of Central Oklahoma*

**Olsen,Dr. Jacilyn** *University of Central Oklahoma*

**Lavine,Barry** *Oklahoma State University*

**Liu,Jianguo** *University of Central Oklahoma*

**Montalvo,Daniel** *University of Central Oklahoma*

**Shaffer,Nicolas** *University of Central Oklahoma*

**Gamagedawara,Sanjeewa** *University of Central Oklahoma*

An analytical method was developed for the analysis of zinc in hair using Flame Atomic Absorption and the analysis of cortisol in saliva using LCMS was developed to determine if the stress of major exams could be detected in university students.

**05.05.07 Synthesis and Biological Studies of Nicotinic and Thio-Nicotinic acid complexes of Platinum**

**Rahman,A.K. Fazlur** *Oklahoma School of Science and Mathematics*

**Lozano-DeAos,Pedro** *Oklahoma School of Science and Mathematics*

We have synthesized a series of Platinum complexes coordinated to organic acids such as nicotinic acid, thionicotinic acid and thio-salicylic acid. Infrared, mass spectroscopic data along with solubility, melting point properties of these complexes will be presented during the presentation.

## **05.05.08 Investigating the Origin of GTP Inhibition within E. coli CTP Synthetase**

**Johnson, Jason** *Southwestern Oklahoma State University*

**Pickens, Ashley** *Southwestern Oklahoma State University*

CTP synthetase (CTPS) is responsible for the de novo synthesis of CTP from UTP, using activated glutamine as the amino donor molecule. Since the enzyme supports DNA replication and concomitant cell division, cancers have been found to be sensitive to drugs that competitively bind within either the pyrimidine pocket or the glutamine active site of CTPS. Recent observations that the allosteric ligand GTP not only activates glutamine hydrolysis activity at low concentrations, but also inhibits CTP synthesis activity at higher concentrations also suggest the GTP analogs might serve as antineoplastic agents. However, earlier research groups report, and our own studies agree, that GTP and its analogs act only as potent activators of CTPS activity, showing no evidence for GTP-mediated inhibition. Certainly, a prerequisite for the rational design of GTP analog drugs is a clear reconciliation of the ligand's impact on CTPS activity. Therefore, we are investigating the origin of reported discrepancies in the mechanism whereby the allosteric effector GTP impacts CTP synthetase activity. Methods include site-directed mutagenesis of CTPS residues highlighted from structural and sequence analysis to potentially mediate the GTP-induced allosteric change, and the expression, purification, and kinetic analysis of the resultant protein variants.

## **05.05.09 Computational Study of Hydrogen Bonding in Alkanes**

**McInnes, Daniel** *East Central University*

**Russell, Charles** *East Central University*

Hydrogen bonding as conventionally described by Pauling, is an electrostatic bond that forms between the most electronegative atoms in the form  $D \cdots H \cdots A$  (D being electronegative atoms such as O or N, and D and A both having at least one lone pair). Hydrogen bonding has also been found occurring between a larger range of donors and acceptors, which implies that hydrogen bonding can nearly always be described as an incipient proton transfer. Further implications are that all molecules that are capable of undergoing Bronsted acid base reactions may also form hydrogen bonds. We are interested in alkanes, which are weakly basic molecules.

#### **05.05.10 Detection and Quantification of Single-Walled Carbon Nanotubes by Chemically Conjugating With Fluorescein Isothiocyanate**

**Lam,Ahn** *University of Central Oklahoma*

**Zhou,Feifan** *University of Central Oklahoma*

**Chen,Wei** *University of Central Oklahoma*

Fluorescein Isothiocyanate (FITC) is a derivative of the bright green fluorescein. With unique properties such as high light absorption, excellent water solubility, and good fluorescein quantum yield, it is commonly used as a functional dye in a wide-range of scientific research. Single-walled carbon nanotubes (SWNTs) are promising materials for biomedical applications. Having the ability to cross cellular membranes without eliciting cytotoxicity, SWNTs have been studied to deliver many drugs or proteins to target cells. Moreover, with a high optical absorbance in the near-infrared region, SWNTs also play a novel role in photothermal therapy for cancer treatment. To determine the appropriate amount of SWNTs needed in biomedical applications, SWNTs were conjugated with FITC to form a nanocomplex that could be detected by fluorescein microscope or fluorescein spectroscopy in our laboratory. Because the fluorescence intensity is proportional to the radiant power and the concentration of the emitting substances, we also developed a standard FITC calibration curve to determine the amount of SWNTs in the nanocomplex. Our research could lead to the development of new applications of SWNTs in the biomedical fields, particularly in cancer detection and treatment. Keywords: Single-walled carbon nanotube (SWNT), Fluorescein Isothiocyanate (FITC), Photothermal therapy, Cancer treatment

#### **05.05.11 Inhibition Testing of the Metallo-beta-lactamase (Bla2) found in Antibiotic Resistant Bacillus anthracis**

**Demuth,Mara** *Northeastern State University*

**Kim,Sung-Kun** *Northeastern State University*

Antibiotic resistance has emerged as a serious threat to public health. Much of the resistance is found in the widely used beta-lactam antibiotic groups and is due to genetic mutations that cause the development of an enzyme called metallo-beta-lactamase (MBL). Unavailability of therapeutic inhibitors has led to a search for novel inhibitors. The MBL from *Bacillus anthracis* (Bla2) was chosen for this study. Successful purification for Bla2 was confirmed by SDS-PAGE analysis, and attempts were made to inhibit this enzyme using hydroxamate-group-containing molecules. Initial kinetic studies suggest significant inhibition in the molecule containing two hydroxamate functional groups with a promising IC<sub>50</sub> value but no significant inhibition in the single hydroxamate containing molecule. Later kinetic analysis reveals the significant inhibition to be competitive with an extraordinary K<sub>i</sub> value. Dimethyl sulfoxide was used to increase inhibitor solubility, and further enzyme assay revealed enzyme stability up to approximately 2% dimethyl sulfoxide. In silico analysis showed inhibitor docking to the active site of Bla2 which provides a link between experimental and theoretical work. These findings offer new avenues for designing better inhibitors against MBLs.

## **05.05.12 Inhibition of *Thermus aquaticus* DNA Polymerase by Bridged Nucleosides using Real-Time qPCR**

**Dinkel,Austin** *Northeastern State University*

**Kim,Sung-Kun** *Northeastern State University*

The inhibition of DNA replication is a vital strategy for combatting cancers and viruses. The long-term use of current agents leads to adverse side effects and the development of resistance. Nucleosides with modifications to the sugar moiety have proved dominant in research to develop new potential drug candidates to inhibit DNA replication. The modification of the 2',4' position of the ribose with inclusion of a bridge was tested on its inhibition of Taq DNA Polymerase using real-time quantitative PCR. This revealed the significant inhibitory action of 2',4'-bridged thymidine. A deeper look into the mechanics revealed the competitive mechanism by which 2',4'-bridged thymidine operates. With a  $K_i$  value of  $9.7 \pm 1.1 \mu\text{M}$ , the 2',4'-bridged thymidine proved to be a very promising inhibitor. Further analysis shows all nucleosides tested bind in the active site, proving the substrate analogs are structurally complementary to the active site. Evidence shows the importance of Asp610 in the active site when binding with 2',4'-bridged thymidine. Overall, the active site inhibition of 2',4'-bridged thymidine shows the potential of bridged nucleosides as drug candidates.

## **05.05.13 Purification and Characterization of the IMP-1 Metallo-Beta-Lactamase From *Pseudomonas aeruginosa***

**Schmidt,Alexander** *Northeastern State University*

**Kim,Sung-Kun** *Northeastern State University*

Beta-lactam antibiotics are among the most important drugs to fight bacterial infection, but due to misuse, some bacteria have become resistant to these antibiotics. Metallo-beta-lactamase is a resistant enzyme that catalyzes the hydrolysis of beta-lactam antibiotics. Unlike metal-independent beta-lactamases, no clinically useful inhibitors of metallo-beta-lactamases have been found. To further characterize metallo-beta-lactamases, the metallo-beta-lactamase IMP-1 from *Pseudomonas aeruginosa* has been overexpressed and purified to homogeneity by  $\text{Ni}^{2+}$  affinity chromatography. Homogeneity was confirmed by SDS-PAGE. An enzyme assay was performed on IMP-1 with penicillin G as a substrate. The results showed that the  $K_m$ ,  $V_{max}$ ,  $k_{cat}$ , and catalytic efficiency of the IMP-1 tested were in accordance with previous IMP-1 studies. The effects of temperature on IMP-1 was tested with various temperatures ranging from 20 °C to 70 °C. The results showed that IMP-1 was able to maintain high levels of activity with temperatures up to 60 °C. In silico, pH-dependent assay analyses are underway in order to further investigate the inhibition by chelators and completely understand the mechanism of IMP-1.

## **05.05.14 Quantitative Determination of Calcium Content in Commercially Available Cereal Samples Using Flame Atomic Absorption Spectroscopy**

**Gamagedara, Dr. Sanjeewa** *University of Central Oklahoma*

**Ellis, Tanara** *University of Central Oklahoma*

**Collins, Leslie** *University of Central Oklahoma*

The purpose of this project was to utilize the tools and knowledge in studied Quantitative Chemical Analysis class to quantify calcium in multiple brands of popular cereal. Also to determine if it is a sufficient source of calcium to meet the daily dietary recommendations for ages 19-50. The calcium content was measured using Flame Atomic Absorption (FAA) Spectroscopy. Standard Addition calibration method was used to prevent the suppression or enhancement of the signal by the matrix of the aqueous solution. Approximately 5 grams of each sample of cereal was crushed, then placed in a muffle furnace to dry to weight constant. After heating and cooling, a 5-mL of 12 M HCl was used to dissolve the cereal, then diluted to 100-mL and filtrated. For each sample, a 5-mL aliquot was pipetted into 50-mL volumetric flask, along with 5-mL of Lanthanum Matrix Modifier solution, and diluted with deionized water. For the Standard Addition solutions, a 1-mL aliquot was pipetted into a 50-mL volumetric flask, along with 5-mL of La Matrix Modifier solution and 1-5 mL of CaCl<sub>2</sub> standard solution, and diluted with deionized water. The absorbance for each solution was measured using FAA. Overall, our determined calcium content matched the percentage of calcium on each box, for each brand of cereal. The percent recoveries of Ca were calculated based on the label values. The percentage recovery of Lucky Charms, Cinnamon Toast Crunch, Cheerio's, Golden Graham's, and Hershey Kisses were 59

## **05.05.14 Quantitative Determination of Calcium Content in Commercially Available Cereal Samples Using Flame Atomic Absorption Spectroscopy**

**Dinh, Phuong** *University of Central Oklahoma*

The purpose of this project was to utilize the tools and knowledge in studied Quantitative Chemical Analysis class to quantify calcium in multiple brands of popular cereal. Also to determine if it is a sufficient source of calcium to meet the daily dietary recommendations for ages 19-50. The calcium content was measured using Flame Atomic Absorption (FAA) Spectroscopy. Standard Addition calibration method was used to prevent the suppression or enhancement of the signal by the matrix of the aqueous solution. Approximately 5 grams of each sample of cereal was crushed, then placed in a muffle furnace to dry to weight constant. After heating and cooling, a 5-mL of 12 M HCl was used to dissolve the cereal, then diluted to 100-mL and filtrated. For each sample, a 5-mL aliquot was pipetted into 50-mL volumetric flask, along with 5-mL of Lanthanum Matrix Modifier solution, and diluted with deionized water. For the Standard Addition solutions, a 1-mL aliquot was pipetted into a 50-mL volumetric flask, along with 5-mL of La Matrix Modifier solution and 1-5 mL of CaCl<sub>2</sub> standard solution, and diluted with deionized water. The absorbance for each solution was measured using FAA. Overall, our determined calcium content matched the percentage of calcium on each box, for each brand of cereal. The percent recoveries of Ca were calculated based on the label values. The percentage recovery of Lucky Charms, Cinnamon Toast Crunch, Cheerio's, Golden Graham's, and Hershey Kisses were 59

### **05.05.15 Quantitative Determination of Caffeine in Popular Energy Drinks using High Performance Liquid Chromatography**

**Gamagedara, Dr. Sanjeewa** *University of Central Oklahoma*

**Collins, Leslie** *University of Central Oklahoma*

**Craig, Cole** *University of Central Oklahoma*

Caffeine has become a globally consumed food constituent for its physiological effects. While coffee has historically been the most popular way to consume caffeine, energy drinks have been gaining popularity among teens and young adults. The current recommendation for caffeine consumption is 5.7 mg/kg of body weight. High pressure liquid chromatography was employed in order to estimate the amount of caffeine contained in commercially available popular energy drinks. The five energy drinks that were used in this study were: Rockstar, Full Throttle, Monster, Nos, and Redbull. The commercial energy drinks were obtained from a local retail store in Edmond, OK. Caffeine was separated using C18 column with 60:40 ratio of methanol and NaH<sub>2</sub>PO<sub>4</sub> as the mobile phase. Each energy drink sampled was ran in triplicates to assure statistical significance. The results from this study indicated that all five of the energy drinks examined displayed a higher caffeine content than what was represented on the nutritional facts label.

### **05.05.16 Stereoselective Hydroxylation of Vitamin D Core System**

**Albinescu, Dragos** *Northeastern State University*

This research project presents the 1 $\alpha$ -hydroxylation sequence of vitamin D core fragment, as part of a multistep synthesis of 1 $\alpha$ -hydroxyvitamin D<sub>5</sub>, a potent anticancer agent and an inhibitor of the renin gene expression. The 1 $\alpha$ -hydroxylation of vitamin D is the final metabolic step that occurs in kidney and fully activates vitamin D to its most potent metabolite. In the chemical synthesis of the 1 $\alpha$ -hydroxyvitamin D<sub>5</sub>, the 1 $\alpha$ -hydroxylation step was accomplished by using selenium dioxide/ N-methylmorpholine-N-oxide (MNO) oxidation system, that produced the desired 1 $\alpha$ -hydroxylated derivative in an excess of 4:1 to the 1 $\beta$ -hydroxylated, inactive derivative.

### **05.05.17 Using Microwaves for Organic Syntheses in Undergraduate Organic Labs**

**Rivas, Alexander** *Cameron University*

**Nalley, Elizabeth** *Cameron University*

Allowing many chemical reactions to be completed within minutes, microwave heating has revolutionized preparative chemistry. As a result, this technology has been widely adopted in both academic and industrial laboratories. Integrating microwave-assisted chemistry into undergraduate laboratory courses enables students to perform a broader range of reactions in the allotted lab period. As a result, they can be introduced to chemistry that would otherwise have been inaccessible due to time constraints (for example, the need for an overnight reflux). A number of the chemical transformations use water as a solvent in lieu of classical organic solvents. This contributes to greener, more sustainable teaching strategies for faculty and students, while maintaining high reaction yields. The advantages inherent in microwave use make it ideal for the undergraduate laboratory. Although students are exposed to many different reactions in the classroom, many important organic reactions described in undergraduate textbooks are presently not included in the laboratory course owing to long reaction times, high temperatures, or sensitive reagents that present a potential danger to the students. In this poster, five syntheses using microwave heating will be described.



## **05.05.18 PCBP2 Knockdown Leads to Iron Overload in Mouse Liver Tissue**

**Rivas,Alexander** *Cameron University*

**Li,Fengmin** *Other*

**Philpott,Caroline** *Other*

Iron is an essential co-factor for many proteins involved in central cellular processes and is toxic at high concentrations. Therefore, iron storage, uptake and utilization are tightly regulated. Ferritin, the ubiquitous iron storage protein, Hepcidin a liver hormone that controls cellular iron release, Iron Regulatory Protein 2 (IRP2) and the Transferrin receptor, a protein and transmembrane iron importer respond to fluctuations in iron concentration and function to bring iron to stable levels. Poly (rC)–binding proteins 1 and 2 (PCBP1 and PCBP2) are multifunctional adaptor proteins that bind cytosolic iron for delivery to target apoproteins. We studied the regulation of iron related proteins in a mouse model of PCBP2 knockdown mice. We hypothesized that PCBP2 knockdown leads to iron overload in liver tissue. We used western blots to measure protein expression in response to PCBP2 is knocked down, Real-Time PCR to quantify the gene expression levels of iron related proteins. Compared to the wild type Heterozygous PCBP2 Knockdown mice showed significant elevation in liver Hepcidin levels along with decreased transferrin, and IRP2 levels. PCBP1 remained constant and PCBP2 expression was reduced by half. This shows that PCBP2 has a role in cellular iron regulation.

## **05.05.19 Microwave Synthesis of Tetraphenylporphyrins and Tetraphenylporphyrin Derivatives**

**Hjolmo,Pasang** *Cameron University*

**Nalley,Elizabeth** *Cameron University*

**Rupakheti,Sujana** *Cameron University*

Allowing many chemical reactions to be completed within minutes, microwave heating has revolutionized preparative chemistry. As a result, this technology has been widely adopted in both academic and industrial laboratories. Integrating microwave-assisted chemistry into undergraduate laboratory courses enables students to perform a broader range of reactions in the allotted lab period. As a result, they can be introduced to chemistry that would otherwise have been inaccessible due to time constraints (for example, the need for an overnight reflux). A number of the chemical transformations use water as a solvent in lieu of classical organic solvents. This contributes to greener, more sustainable teaching strategies for faculty and students, while maintaining high reaction yields. Tetraphenylporphyrins can be synthesized from pyrrole and benzaldehyde using a conventional microwave oven. This synthesis and other synthesis of other derivatives of tetraphenylporphyrins will be described.

### **05.05.21 Malaria, A Parasitic Disease : An Educational Study of its Cause and Cure**

**Rahman,A.K.Fazlur** *Oklahoma School of Science and Mathematics*

**Pan,Amanda** *Oklahoma School of Science and Mathematics*

**Gattani,Mansi** *Oklahoma School of Science and Mathematics*

**Zhangs,Maggie** *Oklahoma School of Science and Mathematics*

Title : Malaria, a Parasitic Disease : Cause and Cure Authors : Mansi Gattani, Amanda Pan, and Maggie Zhang's Oklahoma School of Science and Mathematics Advisor : A.K.Fazlur Rahman, Ph.D. Abstract: An estimated 2 billion people are infected with at least one parasite. Malaria causes about 2.5 million deaths annually. Malaria and other parasitic diseases have ravaged mankind, presenting a health crisis throughout the world. This year's Nobel Prize in Medicine provided a possible solution to combat this debilitating disease. Two compounds, Ivermectin and Artemisinin are the two key compounds discovered independently by two different groups. These compounds have fundamentally also changed treatment of parasitic diseases such as River Blindness and Lymphatic Filariasis. This presentation aims to provide an overview of the cause and cure of the 2015 noble winning parasitic diseases, Malaria. In particular, the authors will examine the source, extraction, structure and the application chemistry of Artemisinin and Ivermectin.

### **05.05.22 Nonsteroidal anti-inflammatory drug (NSAID) : Understanding How Does it Work ?**

**Rahman,A.K.Fazlur** *Oklahoma School of Science and Mathematics*

**Nuguri,Sona** *Oklahoma School of Science and Mathematics*

**Lee,Michael** *Oklahoma School of Science and Mathematics*

Nonsteroidal anti-inflammatory drug (NSAID) : How Does it Work ? Authors : Sona Nuguri and Michael Lee Oklahoma School of Science and Mathematics 1141 N Lincoln Blvd, OKC, OK 73104 Faculty Advisor: A.K.Fazlur Rahman, Ph.D Abstract : Non-Steroidal anti-inflammatory agents such as aspirin and naproxenes act by inhibiting the biosynthesis of prostaglandins (PGs from arachidonic acid (AA). There are two human enzymes that catalyze the first step in the biosynthesis of PG's cyclooxygenase 1- and 2 (COX-1 and COX-2). NSAIDS are usually used for the treatment of acute or chronic conditions where pain and inflammation are present. Since most NSAIDS inhibit the activity of COX-1 and COX-2, It is believed that inflammatory function is a part of the human healing process as it resolves in pain and fever. In this presentation we discuss an overview of inflammation and how do the anti-inflammatory drugs works?

## **05.05.23 Chemistry Explains the Spiciness in Chilli Papers : Capsicinoids**

**Rahman,A.K.Fazlur** *Oklahoma School of Science and Mathematics*

Abstract : Chemists have long been seeking to understand and explain the hotness in chillies. Literature study suggests that there are two compounds namely Capsaicin and Dihydro-capsaicin are responsible for the hotness in chilli. The authors will explain Scoville heat index in this presentation

## **05.05.24 Characterization of the Slow-Binding Inhibition by Acetopyruvate of the Dihydrodipicolinate Synthase from E. coli**

**Fleming,Christian** *University of Central Oklahoma*

**Mesiya,Sidra** *University of Central Oklahoma*

**Karsten,William** *Other*

**Thomas,Lenorad** *Other*

**Chooback,Lilian** *University of Central Oklahoma*

Dihydrodipicolinate synthase (DHDPS) catalyzes the first step in the biosynthetic pathway for production of L-lysine in bacteria and plants. DHDPS reaction is the rate limiting step in lysine biosynthesis and involves the condensation of aspartate- $\beta$ -semialdehyde (ASA) and pyruvate to form 2, 3-dihydrodipicolinate. The kinetic mechanism is ping pong with pyruvate initially forming a Schiff base with K161 followed by loss of a proton to generate an enamine intermediate followed by binding of ASA. The enzyme has received interest as a potential drug target owing to the absence of the enzyme in mammals. Acetopyruvate (ACP) is a slow-binding inhibitor of DHDPS that is competitive versus pyruvate with an initial  $K_i$  of about 250  $\mu$ M and a final inhibition constant of about 2  $\mu$ M. The enzyme:ACP complex displays an absorbance spectrum with a  $\lambda_{max}$  at 303 nm and a longer wavelength shoulder. The rate constant for formation of the complex is 0.03 s<sup>-1</sup>. The enzyme forms a covalent enamine complex with the first substrate pyruvate and can be observed spectrally with a  $\lambda_{max}$  at 275 nm. The spectra of the enzyme in the presence of pyruvate and ACP shows the initial formation of the enamine intermediate followed by the slower appearance of the E:ACP spectra with a rate constant of 0.005 s<sup>-1</sup>. The crystal structure of the enzyme:ACP complex confirms the formation of the Schiff base.

**05.05.25 The Effect of Macromolecular Architecture on Functional Group Accessibility: Hydrogen Bonding in Blends Containing Linear Homopolymers and Linear Copolymers.**

**Dunn,Tia** *Northeastern State University*

An investigation of phenolic functional group accessibility in poly(2-vinyl pyridine-co-styrene) (P2VPS) and poly(2-vinyl pyridine) (P2VP) with hyper branched poly(4-hydroxystyrene) (PHS-B) is presented. The extent of hydrogen bonding and phase behavior in blends of P2VP/PHS-B and P2VPS/PHS-B with the corresponding Lewis base were measured using differential scanning calorimetry and calculated by the increase in glass transition temperature ( $T_g$ ). Evaluated with respect to the weighted average for the 2VP polymers and PHS-B, both P2VP/PHS-B and P2VPS/PHS-B blends observed at least one glass transition. Two  $T_g$ 's were observed in heating at some compositions for the PHS-B/ co-polymer system only of which were significantly higher than the weight average for P2VPS and PHS-B. The Kwei  $q$  parameter was higher for P2VP homo-polymer compared to P2VPS co-polymer. Incorporating styrene simply decreased the number of sites available for inter-molecular interactions.

**05.05.26 Organic Synthesis of a Novel Compound for Inhibition Studies on Dihydrodipicolinate Synthase**

**Evans,Russell** *University of Central Oklahoma*

**Fleming,Christian** *University of Central Oklahoma*

**Chooback,Lilian** *University of Central Oklahoma*

The molecule 2-hydroxy-4-oxobutanoic acid is similar to pyruvate, the natural substrate for DHDPS, and is believed to have strong inhibitory properties and could lead to a model for drug design. The enzymes, DHDPS and the coupling enzyme, dihydrodipicolinate reductase (DHDPR), were purified from *E. coli*. Protein purification was completed using nickel affinity chromatography. Inhibition studies will be carried out with the synthesized product and DHDPS.

**05.05.27 A Computational Study of Product Distribution in Free Radical Halogenations**

**Crittell,Charles** *East Central University*

**Clark,Mark** *East Central University*

This project will measure the activation energy of several free radical chlorination reactions by empirically determining the energy levels of the different transition states. These calculations will be performed using the program WebMo on the super computer at the University of Oklahoma. The transition state energies will then be used to estimate the distribution of the monochlorinated products. These ratios will be compared to those determined experimentally.

## **05.05.28 A Kinetic Study of the Enzyme Papain.**

**Crittell, Charles** *East Central University*

The enzyme papain is a thiol protease containing a sulfhydryl group in the active site of the enzyme. Papain is found in papaya. This enzyme has many industrial and commercial uses. The kinetic parameters including  $V_{max}$  and  $K_M$  were measured at different pH using the chromogenic substrate N-benzoyl-arginine-p-nitroanilide (BAPNA). It was determined the  $K_M$  had a minimum value at pH of 6.5 indicating tight binding to the substrate.

## **05.05.29 High Performance Liquid Chromatography Method Development and Validation for the Quantification of 4-hydroxybenzoate and Related Biomarkers in Urine**

**Gamagedara, Dr. Sanjeewa** *University of Central Oklahoma*

**Hassan, Zayed** *University of Central Oklahoma*

**Yen, Ting-An** *University of Central Oklahoma*

Urine analysis to detect biomarkers associated with diseases, especially cancer is getting much attention because of its noninvasiveness. In an effort to identify useful biomarkers for kidney cancer, recent studies have shown that 4-hydroxybenzoate, related metabolites can be potentially used for the diagnosis process. High Performance Liquid Chromatography (HPLC) coupled with Diode Array Detection (DAD) provides an ideal tool for urine analysis of these biomarkers due to its availability most analytical laboratories. In this study, we developed a noninvasive method to separate and quantify 4-hydroxybenzoate, 2,3-pyridine carboxylic acid, 2,5-dihydroxy benzoic acid in synthetic urine using reverse phase HPLC, with creatinine as an indicator for renal dilution. After getting the optimum separation in HPLC, a thorough analytical method validation was conducted to optimize the method validation parameters such as LOD, LOQ, linearity, accuracy, robustness and precision. The detailed experimental conditions and the results will be presented at the conference.

### **05.05.30 The Effect of Compatible Solutes on the Melting Temperature of Halorhodospira Halochloris DNA**

**Deole,Ratnakar** *Northeastern State University*

**Rojo,Lindsey** *Northeastern State University*

**Behdad,Layli** *Northeastern State University*

Aquatic saline environments compose approximately 97% of water on earth and salt deposits may be found in over one fourth of the land. Organisms living in these hypersaline conditions are classified as Halophiles. Halophiles have adapted survival strategies that allow for growth, metabolism and reproduction in hypersaline conditions. One of these adaptations includes de novo synthesis of intracellular compatible solutes. These compatible solutes, called osmolytes, balance the osmotic pressure inside the cell with the pressure surrounding the cell allowing the organism to maintain cell turgor and reduce osmotic stress. Furthermore, compatible solutes also play a role in protein stabilization, protecting against denaturation at high temperatures and in hypersaline conditions. Extensive research has been conducted to investigate the stabilizing mechanisms and effects of compatible solutes on proteins, however, limited research has been conducted on the effects of compatible solutes on DNA. Halorhodospira halochloris, an extreme halophile, accumulates ectoine, proline and trehalose as compatible solutes. H. halochloris was grown in media supplemented with NaCl ranging from 5 – 35%. DNA was extracted from the cells growing at each of the listed concentrations and was treated with ectoine, proline and trehalose at range of concentrations going from 100mM to 1M. DNA melting curves were obtained using a UV/Visible Spectrophotometer, equipped with a Peltier temperature control

### **05.05.31 Synthesis, Mass Spectroscopic and Cell Culture Studies of Platinum complexes of Carboxylic acid Complexes**

**Hillis,Nathan** *Oklahoma School of Science and Mathematics*

**Rahman,A.K.Fazlur** *Oklahoma School of Science and Mathematics*

Cis-Platin,  $(\text{NH}_3)_2\text{PtCl}_2$  and Carbo-platin  $(\text{C}_2\text{O}_4)\text{PtCl}_2$  are well established therapeutic metal complexes for various form of cancer. In this project we have conducted reactions with platinum moiety with various carboxylic acids such as Nicotinic acid, salicylic acid and amino acids. In this presentation we will discuss how we have synthesized and spectroscopically characterized some of these complexes. Biological study of these complexes such as antitumor activity of these complexes are underway.

### **05.05.32 Determination of dibutyl phthalate in infant formula**

**Bowen,John** *University of Central Oklahoma*

**Lewis,Dalton** *Other*

Phthalate ester plasticizers, including dibutyl phthalate have been implicated as endocrine disruptors. These compounds leach from plastics into liquids and many were banned from toys and baby products in 1996, but is commonly found in water in contact with PVC piping. For this study, an analytical method was adapted to detect and quantitate phthalate esters in infant formulas and baby food sold in plastic containers for the head space analysis using gas chromatograph mass spectroscopy with concentration by solid phase microextraction (HS SPME GC-MS). Results from various products will be discussed.

**05.05.33 Utilizing Volatile Organic Compounds to differentiate between Methicillin Resistant and Sensitive Strains of Staphylococcus Aureus using Solid Phase Micro Extraction (SPME) and Gas Chromatography-Mass**

**Bowen, John** *University of Central Oklahoma*

**Dressler, Garrett** *University of Central Oklahoma*

**Brennan, Robert** *University of Central Oklahoma*

It is well known that microorganisms can and do give off distinct odors such as body odor or the characteristic odor of yeast. In light of that knowledge, pure strains of Staphylococcus Aureus, both methicillin resistant and methicillin sensitive, were sampled during this study. The motivation behind this was to attempt to identify the different volatile organic compounds (VOC) given off by both the resistant and sensitive strains. The end goal of the study was to be able to establish that the resistant strains give off unique VOC's apart from the sensitive strains. Solid Phase Micro Extraction (SPME) is a very useful technique for the analysis of VOC's. Therefore, for this study, headspace samples were collected using SPME with subsequent analysis using Gas Chromatography/Mass Spectrometry (GC-MS). Data and results to be presented.

**05.05.34 Analysis of Quercetin and Resveratrol in red wines and grapes using HPLC**

**Bowen, John** *University of Central Oklahoma*

**Jin, Quanxiu** *University of Central Oklahoma*

**Liu, Jianguo** *University of Central Oklahoma*

An analytical method for high performance liquid chromatography (HPLC) was developed for the analysis of the antioxidants resveratrol and quercetin in goji berry. Quantitative results will be presented for these compounds.

**05.05.35 Synthesis of Malachite Green and Its Application In Solar Cells**

**Lutz, James** *Cameron University*

**Hillis, Nathan** *Cameron University*

In this research a new synthesis of Malachite Green has been developed using microwave technology to prepare the dye. The procedure for synthesizing the dye and its application in dye-sensitized solar cells will be discussed. These cells consist of titanium dioxide nanocrystals that are coated with light-absorbing dye molecules and immersed in an electrolyte solution, which is sandwiched between two glass plates. Light striking the dye frees electrons and creates "holes"--the areas of positive charge that result when electrons are lost. The semiconducting titanium dioxide particles collect the electrons and transfer them to an external circuit, producing an electric current. The cells can be connected in series to produce cells with voltages as high as five volts which can be used to power a small motor.

### **05.05.36 Solid State Reactions of Titanium Dioxide with Silicon Dioxide**

**Myers,Dwight** *East Central University*

**Brown,Chundira** *East Central University*

There are questions as to the reaction or extent of reaction of titanium dioxide (rutile) with silica. Conflicting reports have been made as to whether they are reactive or not, and at what temperatures. Both are important as potential thermal barrier coatings or environmental barrier coatings in combustion environments, as for example in gas turbine technologies. The extent of reaction and temperature range are important questions to answer for this chemical system. Solid state reactions of titanium dioxide with silicon dioxide are being attempted. Mixtures of the two oxides have been subjected to heatings at various temperatures from ca. 1200 - 1500°C. Samples are being characterized before and after heatings by means of X-ray diffraction, and diffuse reflectance infrared spectroscopy, transmission infrared spectroscopy, and/or diffuse reflectance UV/Vis spectroscopy, as appropriate. Results to date will be presented.

### **05.05.37 Synthesis of Azo Dyes Prepared from Diazonium Salts and Their Applications in Dye Sensitized Solar Cells**

**Ilondior,Emmanuel** *Cameron University*

**Nalley,Elizabeth** *Cameron University*

Cameron University, Lawton, OK 73505 Arediazonium salts are generated by the reaction of a primary amine with nitrous acid (produced from sodium nitrite) as shown below. The aromatic amines (anilines) are generated by the reduction of the corresponding nitro compound, which is easily prepared via electrophilic nitration of the ring (see nitration of methyl benzoate). The diazonium salts are unstable at temperatures above 5 - 10°C and some explode if allowed to dry. The aliphatic counterpart can be prepared in the same way; however, even at low temperature it is more unstable and can spontaneously decompose by loss of nitrogen to produce carbocation. A useful reaction of diazonium ions is their use as electrophiles in electrophilic aromatic substitution reactions. They will react with highly activated aromatic systems (phenols, arylamines) to yield azo compounds (diazo coupling reaction). Due to the extended system of delocalized pi electrons, azo compounds are usually colored and therefore have found use as dyes. In this presentation, the synthesis of several dyes will be described. These dyes were tested as possible photoreceptors in dye sensitized solar cells. The results of these tests will be discussed.

### **05.05.38 Isolation and Structure Elucidation of Siderophores Produced by Marine Bacteria**

**DeMoss,Emily** *Northeastern State University*

**Martin,Jessica** *Northeastern State University*

In low-iron environments, many bacteria utilize iron (III) chelators to solubilize and transport iron into the cell. These iron (III) chelators, called siderophores, can have many different structures. The objective of this project is to identify novel siderophores produced by marine bacteria. Before determining the structure, siderophores were first grown in cultures of low-iron artificial seawater and purified using RP-HPLC. To test for the presence of siderophores before purification, Fe(III)-CAS Assay was used. Purified siderophores were then analyzed using mass spectrometry and tandem mass spectrometry. Structure determination was done using amino acid analysis and NMR.



#### **05.05.39 Production of Siderophores by Marine Fungi to Determine Known and Unknown Structures**

**Thorman, Trevor** *Northeastern State University*

Some marine fungi have developed mechanisms for the uptake of iron in marine environments. These fungi produce siderophores, which are secreted into the environment and bind iron. They are then brought back into the cell. Siderophores have many different identified structures with potential for new unidentified structures to be discovered. In this experiment two marine fungi, *C. elegans* and another fungi labeled 05-001, were grown in artificial seawater separately and were later isolated. HPLC was run with mass spec to determine structures. The two fungi were then grown together, allowing competition to produce more known structure siderophores and new unidentified siderophores.

#### **05.05.40 A Study of Iodine Gas Scrubber Efficiency and Iodine Distribution in Northwestern Oklahoma Brine Waters**

**wickham, jason** *Northwestern State University*

**Anderson, Austin** *Northwestern State University*

In the late 1970's, it was discovered that the brine waters of NW OK contain significant amounts of iodine (above 60 ppm). However, the exact amounts and distributions of iodine throughout this region were unknown. Currently, the majority of the world's supply of iodine comes from mining iodate minerals in Chile (~ 65%), brine water aquifers in NW Oklahoma (~ 5%) and Japan (~ 25%), and seaweed extraction. With the growing need for iodine compounds in the various fields the demand for iodine is higher than ever. Thus, Iofina has recruited the aid of NWOSU to quantify the iodine concentrations and distribution throughout the brine aquifer, as well as, determine the longevity of these iodine concentrations. Currently, this study has to the discovery of new sites within the aquifer that may be of commercial interest and has taken an in-depth look at three of these possible sites, as well as, measuring iodine fluctuations up to 100 ppm which is a much larger fluctuation than the expected 10 ppm. Currently, we are investigating rather these fluctuations are due to the changed from vertical to horizontal wells or inhomogeneity within the brine aquifer. We also studied iodine gas scrubber efficiencies, which captures iodine gas during the crystallization process. A balance between fluid recirculation rate, air flow, internal surface area, and a chemical balance without disrupting other plant operations is needed, which will result in improved overall iodine

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **06. Computer Science**

##### **05.06.01 SquerylORM Code Generator**

**Harrington,Patrick** *Northeastern State University*

Many Object Relational Mapping (ORM) software products include features that allow the programmer to specify database schema in the ORM code that can then be used to generate new tables in a database that did not previously exist. The problem with this is that it can lead to poor database design, especially because these features typically make using relational features like foreign keys very difficult or impossible. It is more desirable to design the database first and then establish ORM code. The purpose of this project is to create a program that will connect to a database and generate ORM code for an existing database using the Scala programming language. This project achieved its primary goal of generating ORM code using existing databases as the source. The end result is simple and effective.

##### **05.06.02 A Wheelchair Tilt/Recline Guidance Application Associated with Fitness Trackers for Power Wheelchair Users to Reduce the Risk of Pressure Ulcers**

**Zeng,Wenxi** *University of Central Oklahoma*

**Fu,Jicheng** *University of Central Oklahoma*

Unrelieved prolonged sitting pressure is a major causative factor of pressure ulcers (PUs), which significantly affects the life quality of power wheelchair users. To reduce the PU risk, wheelchair tilt and recline functions are typically used to relieve seating pressure. Unfortunately, most wheelchairs lack of a mechanism for measuring tilt or recline angles. Wheelchair users have to make adjustments according to personal perceptions and preference, which causes insufficient pressure relief. Our study aims to address this issue by using a fitness tracker (i.e., Microsoft Band in the current implementation) associated with a mobile and cloud system. First, wheelchair users conveniently place the arm wearing the Band on their upper body, thereby moving the Band along with the tilt and recline movements. Since the Band is easy to pair with a smartphone via Bluetooth, sensor data can be obtained in real-time. Next, based on sensor data, the angles are precisely measured by a novel algorithm employing advanced math and physics models. Particularly, hand-free operations are achieved by speech recognition and synthesis techniques. Hence, the mobile subsystem in the smartphone improves the effectiveness of Tilt/Recline usage. In addition, records of Tilt/Recline usage are transmitted to the cloud subsystem, where statistic information is generated for healthcare providers and wheelchair users. As a conclusion, our research will benefit wheelchair users and the clinical community.

### **05.06.03 A Novel Health Tracker for Power Wheelchair Users Using Microsoft Bands**

**Li,Fang** *University of Central Oklahoma*

**Fu,Jicheng** *University of Central Oklahoma*

Our current research has already developed a mobile and cloud computing-based (MC) system, which uses a smartphone to collect and analyze wheelchair maneuvering data. The use of smartphones has some disadvantages, such as the dependence of smartphone holder, limited battery life, etc. Hence, we propose to use Microsoft Band as a substitution of smartphones for data collection. When being paired with a Microsoft Band via Bluetooth, the MC system will automatically use the Microsoft Band as its data logger. The sensor data will be transmitted and saved in the smartphone's SD card. Then, the data will be periodically uploaded to the Google Application Engine (GAE), where our cloud subsystem resides. Although there are many smartphone apps that can help people monitor their health status, no mobile applications are designed specifically for wheelchair users. Therefore, our project is very meaningful for wheelchair users to improve their quality of life.

### **05.06.04 A Class Project - A Multi-Feature SE School App for Android Devices**

**Su,Ming-Shan** *Southeastern Oklahoma State University*

**Pearce,Keith** *Southeastern Oklahoma State University*

"The Multi-Feature SE School app" was envisioned as a class project that would help with recruiting students to and promoting SE. Nowadays, almost all students have a smartphone (e.g., an iPhone, Android/Windows phone, or Apple iWatch, etc.) and are almost never without it. They use their phone not only as a tool to communicate with their friends and family, but also as an essential miniature computer. SE does not have any school or campus guide related apps published on the Google Play Store or the Apple Store for anyone to download. Therefore, while teaching the Smartphone/Tablet app development class, I asked each student to develop a school app. I believe that a class project like a school app can help a student to learn how to promote a school and to reach more prospective students and encourage them to come to that school and learn how to submit an app to the Google Play Store. In addition, with the knowledge and experience learned from the project, a student can then apply his/her skills to develop apps for a city or company to promote the city or company to attract more visitors or customers after graduation. This school app provides information about the president, facilities, degrees offered, campus map, and class enrollment of SE and a user can use any of the multi-tabbing, swiping, and scrolling features to access this information.

## **05.06.05 Wanderlust: Android Application That Provides Useful Information for Tourists**

**Tavares Pereira,Diego** *University of Central Oklahoma*

**Gomes Dos Santos,Danianny** *University of Central Oklahoma*

**Campos Cardoso,Matheus** *University of Central Oklahoma*

**Felicio de Araujo,Danilo** *University of Central Oklahoma*

Mobile applications changed the way people communicate and access information without using a desktop computer or a laptop, having several different purposes. From applications that help the user to practice exercise to bank applications, mobile applications promise to help the user in their daily lives, in several different areas. The Wanderlust app was developed to help people who are going to travel somewhere combining important tools in order to search for information on the Internet about cities and places to visit. Therefore, Wanderlust turns the task of searching for information easier than getting information in different sources or applications, even with a mobile device. Most information that is shown on the app was retrieved with the use of APIs, such as GoogleMaps API and Open Weather API. Those APIs provided JSON data that was parsed and used in order to show relevant information to the user. The application is able to give information about the weather, commercial places and places to visit of a city, either entered by an input from the user or using its current location, being also possible to mark cities as favorite. Combining these tools in a single application, Wanderlust turns the task of searching information easier than getting information from different sources, even with a mobile device.

## **05.06.06 One Life to Survive, a Mobile Game for Android Phones**

**Kovatana,Komes** *University of Central Oklahoma*

**Sung,Hong** *University of Central Oklahoma*

This zombie-shooter game is a remake of a final project for Object-Oriented Programming class in Spring of 2014. You control a character who's goal is to stay alive as long as possible from the zombie hoard with 1 life. The game ends when you are hit by a zombie. The purpose of this project was to further develop skills for creating a mobile application on Android. Technical challenges include: overcoming the restraint of layout files, making the zombies move towards the player, spawning of zombies, and controlling the character. To avoid modifying layout files, I used the libgdx library to develop the game. The player can shoot n amount of bullets per second and is destroyed when it hits a zombie or goes off screen. Zombies have a chance to drop an upgrade to increase the player's fire rate. Zombies spawn from 1 of 36 slots that surround the outsides of the screen during 5 second intervals starting with 1 while incrementing. Their movement speed is increased at every quarter of 36. Once the count reaches a max of 36, we increase the movement speed instead. Zombies will home in on the player when they spawn. This is achieved by finding the directional vector from the zombie to the player every cycle. The result of this project is a newly acquired skill for mobile game development using Java and a better understanding of the libgdx library.

## **05.06.07 Siege Defense, a Mobile Game for Android Phones**

**Kovatana,Komes** *University of Central Oklahoma*

**Sung,Hong** *University of Central Oklahoma*

This strategy game is the final project for Mobiles Applications class in Fall of 2015. You command a limited size army of 3 different unit types to lay siege upon the enemy base. The enemy tries to defend its walls with towers that shoot projectiles at your army. Your goal is to break down the wall before you run out of troops. The purpose of this project was to develop skills for creating a mobile application on Android. Technical challenges include: overcoming the restraint of layout files, unit creation, animation states, AI behavior, projectile homing. To avoid modifying layout files, I used the libgdx library to develop the game. Units can be upgraded between each round. During the round, units are created as copies of the upgraded units. Units have different states: standing, walking, attacking, dying. Their respective animation will play during these states. Units will walk toward the enemy base when spawned and attack it when within range. Towers will shoot projectiles at the first unit that falls into its attack range. The vector of a projectile is calculated using the position where the target unit will be one second later. The distance they travel is short and quick so precise calculations is unnecessary. The result of this project is a newly acquired skill for mobile game development using Java and a better understanding of the libgdx library.

## **05.06.08 Get Outta My Lair, a Computer Game Written in Java Using Libgdx**

**Kovatana,Komes** *University of Central Oklahoma*

**Stringfield,Virgil** *University of Central Oklahoma*

**McGuire,Cody** *University of Central Oklahoma*

**Nguyen,Don** *University of Central Oklahoma*

**Penning,Cole** *University of Central Oklahoma*

**Varghese,Joby** *University of Central Oklahoma*

This turn-based strategy and dungeon crawler game was for a project in Software Design and Development class in Fall of 2015. It takes place during the Prohibition era in America. You play as a Beholder, a creature that would normally be a monster in this type of game. Our objective was to use an unusual protagonist set in a less used time period. Technical challenges include: creating a turn-based engine, skills, damage system, leveling, traps, inventory, and AI behavior. The player takes a turn by moving a square or using a skill. Skills will either deal damage, negate damage, or apply a beneficial effect followed by a unique animation. Damage is dealt by placing a damage entity on an occupied tile to be handled as a collision event. Perishing enemies grant experience to level up and improve the character as an award for progress. Items can be picked up and held in an inventory for later use. Traps trigger when the player lands in the same tile it occupies. Their effects include: damage, poison, reducing power, and loss of control. AI characters will seek out the player when within range to engage combat.

## **05.06.09 Network On-Line Traffic Policing**

**Qian,Lie** *Southeastern Oklahoma State University*

On-line traffic, such as conversational call, live video, serves a large group of applications in the internet now days. An important feature of on-line traffic is that they are not pre-recorded and no exact information about each session's traffic is known before the traffic happens. S-BIND (Confidence-level-based Statistical Bounding Interval-length Dependent) traffic model was proposed to characterize such traffic for QoS admission (GammaH-BIND) and policing purpose. A state-dependent token bucket based statistical regulator was proposed to police the traffic using S-BIND parameters. However, if the source of the traffic understands the bucket's behavior, it can tune the traffic and cause significant violations in the regulator's output traffic. A new design of state-dependent token bucket for the regulator is proposed here to remove such potential problem and an optimization algorithm is given to improve the regulator's efficiency by removing redundant token buckets in the regulator.

## **05.06.10 Hestia: A real-time strategy game**

**Alrifai,Rad** *Northeastern State University*

**Wells,Kevin** *Northeastern State University*

Hestia is a multiplayer real-time strategy game focusing on high-level strategic decisions. However Lower-level decisions such as battle tactics including individual unit control are performed by Artificial Intelligence (AI). Each player controls one civilization, which consists of a number of cities. Each city has a number of people living in it. People must eat to avoid starvation, which necessitates the collection of wheat. They may also collect wood, used to construct new cities. The actual planning of new city construction is handled by the player. There is a single victory condition called Conquest, which requires the elimination of all other civilizations. Hestia is compatible with Windows, OS X, and Linux computers, written in C++ and uses the Cheese Engine, previously developed by the author for the purpose of games development. Other programming libraries used are boost, libogg, libvorbis, zlib, libpng, SDL2, SDL2\_image, SDL2\_mixer, and RakNet.

## **05.06.11 Substitute Teacher Scheduling System**

**Alrifai,Rad** *Northeastern State University*

**Foreman,Andrew** *Northeastern State University*

Substitute teachers fill in for regular teachers who are not able to work their regular schedule on a given day. This project was designed to create a Web site with hypothetical shift openings and teachers, based on actual schools in the Tulsa, OK school district. Substitute teachers can seek new jobs, and view their job assignments. The system requires all users to register before they can use the site. The project was developed using ASP.NET, HTML, CSS, C#, and MS SQL Server database management system.

## **05.06.12 Organisms! Exploring the Genetic Algorithm**

**Alrifai,Rad** *Northeastern State University*

**Grafton,William** *Northeastern State University*

This project was built with the intention of exploring the genetic algorithm and to examine the possibilities that it provides. The Organisms! Is a simulation software that was designed to give individual "organisms" a life of their own and observe how they interact with each other and their environment? Each organism has a set of traits based off of its core "chromosomes." Each chromosome is modeled as a binary string that represents whether a trait is turned on or off, much like the genetic makeup of most organisms today. The simulation is intended to give each organism a chance to mate and "cross-over" their genetic makeup to the next generation. Each new generation has a chance of getting newer traits that would better aid them in procreation or surviving. The program itself supports the expansion of chromosomes representation from 16 bit binary strings to 32 bit binary strings, representing an even wider array of possibilities. Overall this project was developed for entertainment and to learn and understand the basic fundamentals of advanced AI and problem solving algorithms, such as the genetic and other evolutionary algorithms.

## **05.06.13 Oklahoma Android Storm Shelter System**

**Alrifai,Rad** *Northeastern State University*

**Hillis,Nathan** *Northeastern State University*

Storm shelter databases are currently used in major cities throughout Oklahoma. A user can register through a web portal and the system stores the information in a database. The newly introduced Oklahoma Android Storm Shelter System, enables Android users to register their storm shelter information. This application provides a simple, user-friendly interface and alternate form of media to retrieve current weather information. This alternate registration via mobile application, could increase participation thereby helping to create a more accurate database of in-home storm shelters. The primary goal of this project is to provide a mobile-based registration system with built in weather data services for storm shelter owners that collects shelter location information and stores it in a database. This also alleviates the problem of needing to find an alternate form of media to retrieve current weather information.

## **05.06.14 A Web Application for creating and publishing Requests for Proposals**

**Alrifai,Rad** *Northeastern State University*

**Howard,Gregory** *Northeastern State University*

The Traditional methods of creating and distributing Requests for proposals (RFPs) have several problems. They lack publishing methods that reach all potential suppliers and they lack uniform formats, making it difficult to quickly locate desired information. There also remains a need for a method to allow easy collaboration and editing during the entire process, including post publication. The primary goal of this project is to create a uniform format and a simple and publishing mechanism for RFPs. This project is meant for simple proposals that can be described in simple terms and for the beginnings of proposals to gauge interest from suppliers. The online format is as simple as filling out a form and selecting the option to publish. While the method is simple, it provides everything needed to get an RFP into a public forum where suppliers can find it quickly and easily. The resulting RFP is searchable and can be published and unpublished by simply selecting a checkbox. No data is lost in the process and the RFP remains posted until the Author deletes it. Before beginning this project, I had knowledge of what RFPs were but little knowledge about the creation and publication process. Much of the research, for this project, involved finding accepted practices for what information an RFP should include and finding a common format that will work for most of them.

## **05.06.15 An Inventory Management and Purchase Order System**

**Alrifai,Rad** *Northeastern State University*

**Lopez,Christopher** *Northeastern State University*

SaaSyPantry is designed to combine the workflows of Purchase Order and Inventory Management system with an automatic order processing mechanism. Currently, SaaSyPantry is designed to function as a standalone program; however, the eventual goal of SaaSyPantry is for it to be a member of a restaurant management suite of products that streamline the entire restaurant workflow. SaaSyPantry was developed in C#/WPF and SQLite. C# was chosen because it provides a programming library for Symantics3 API, which allows users to look up products information using UPC barcode. Also, the project uses SQLite to store inventory item and vendor information which gives users a personalized digital "pantry" and enables them to replenish stock from a number of vendors with a single click instead of lengthy phone calls.



## **05.06.16 Expansion of Multi-Sensor Aerosol Products Sampling System (MAPSS)**

**Phares,Dean** *Southwestern Oklahoma State University*

Objective: Increase the accessibility of Space Based Sensor data through the development of automated sensor fusion tools implemented on High Performance Computing (HPC) assets. Thesis: Expanding the accessibility of NASA data enables a larger community to make observations about the significance of aerosol products to life on earth. This research enables improved scientific understanding of atmospheric aerosol phenomenon through remote sensing from space, sensor validation using ground-based and airborne measurements, multi-sensor uncertainty analysis, and applications to model evaluation. In addition, this research is a catalyst for growth in the HPC skills and capabilities at SWOSU and the state of Oklahoma. Methodology: This research extends the work of Charles Ichoku who developed a Multi-sensor Aerosol Products Sampling System (Petrenko 2012) to measure atmospheric aerosols and provide a combined aerosol observation. This tool has limited availability to the public and is not easily modified to facilitate further research. Providing access to this dataset and the algorithms to produce it outside of the NASA Goddard campus, more researchers at other campuses can examine and begin to analyze this valuable data set. Summary: Demonstrate Oklahoma undergraduates contributing meaningfully towards NASA research initiatives using HPC capabilities, and provide a useful dataset for further research in the field of aerosol product observations.

## **05.06.17 Increase the accessibility of Space Based Sensor data through the development of automated sensor fusion tools implemented on High Performance Computing (HPC) assets.**

**Saluja,Prabhjyot** *Southwestern Oklahoma State University*

Expanding the accessibility of NASA data enables a larger community to make observations about the significance of aerosol products to life on earth. This research enables improved scientific understanding of atmospheric aerosol phenomenon through remote sensing from space, sensor validation using ground-based and airborne measurements, multi-sensor uncertainty analysis, and applications to model evaluation. In addition, this research is a catalyst for growth in the HPC skills and capabilities at SWOSU and the state of Oklahoma. This research extends the work of Charles Ichoku who developed a Multi-sensor Aerosol Products Sampling System (Petrenko 2012) to measure atmospheric aerosols and provide a combined aerosol observation. This tool has limited availability to the public and is not easily modified to facilitate further research. Providing access to this dataset and the algorithms to produce it outside of the NASA Goddard campus, more researchers at other campuses can examine and begin to analyze this valuable data set. Summary: Demonstrate Oklahoma undergraduates contributing meaningfully towards NASA research initiatives using HPC capabilities, and provide a useful dataset for further research in the field of aerosol product observations.

## **05.06.18 Expanding Accessibility of NASA's Space-Based Aerosol Sensor Data using Oklahoma State University's "Cowboy" Supercomputer**

**Vantrease, Amy** *Southwestern Oklahoma State University*

Objective: Increase the accessibility of Space Based Sensor data through the development of automated sensor fusion tools implemented on Oklahoma Shared High Performance Computing (HPC) assets available through the OneOklahoma Cyberinfrastructure Initiative. Thesis: Expanding the accessibility of NASA data enables a larger community to make observations about the significance of aerosol products to life on earth. This research enables improved scientific understanding of atmospheric aerosol phenomenon through remote sensing from space, sensor validation using ground-based and airborne measurements, multi-sensor uncertainty analysis, and applications to model evaluation. In addition, this research is a catalyst for growth in the HPC skills and capabilities at SWOSU and the state of Oklahoma. Methodology: This research extends the work of Charles Ichoku who developed a Multi-sensor Aerosol Products Sampling System (Petrenko 2012) to measure atmospheric aerosols and provide a combined aerosol observation. This tool has limited availability to the public and is not easily modified to facilitate further research. The purpose of this research is to demonstrate how to expand a NASA supercomputing task to an Oklahoma Supercomputer. Summary: Oklahoma undergraduates contributing meaningfully towards NASA research initiatives using HPC capabilities in the state of Oklahoma to provide a useful dataset for further research in the field of aerosol product observations.

## **05.06.19 Central Chat: A SaaS Chat Service Powered by Android**

**Gutierrez, Ivan** *University of Central Oklahoma*

We were tasked with developing a mobile application that runs on Android which would serve as an amalgamation of all the skills and techniques we gained during the Mobile Application Programming course. We decided to develop a Software as a Service (SaaS) based instant messenger similar to WhatsApp. With advancements made to android, developers are now more equipped than ever to take advantage of SaaS. It is our hope to use these tools to our advantage to create an instant messaging program which takes use of not only the android SDK but the Google Cloud Services as well. We went with a 2-tiered client/server network with the inclusion of Google Cloud Messaging (GCM). With GCM's ability to write and store client data, and its ability to automatically queue and pull messages sent by our server, it was a perfect fit. If a user is connecting for the first time, a unique identifying key is pushed into a database to ensure that each user name is unique at any given time. Together, all of these elements allowed users to communication without them having to understand how the server handles the messaging. Using a database allows us to retain a list of all connect users so that we can ensure user concurrency within the application. GCM then allows users to effortlessly send messages to other chat users.

## **05.06.20 CANNOT STOP**

**Driver, Callie** *University of Central Oklahoma*

**Song, Samuel** *University of Central Oklahoma*

**Bryan, Brendan** *University of Central Oklahoma*

**Zhao, Qing** *University of Central Oklahoma*

This Android application was developed for researching mechanisms used when creating a fun and interactive mobile application game. Also, the research included learning how to implement version control when working with multiple team members. The state design pattern is one of the behavior design patterns implemented. The pattern permits an object to change its behavior or characteristics when its internal state is altered. The class will be changed by its object. Problems like relativity, keeping track of all of the different events going on in the game, and keeping the code formatted enough to easily make changes, were a big part of creating this application. For some objects being used in the game, we used the state design pattern to change the behavior of them and when they should be removed from the game. To combat the relativity issue, the sizes of the objects drawn on the screen were determined based off the width and height of the canvas using multiplication and division. For version control, we used Source Tree. This was to let us combine our work together with ease. As a result, adding design patterns to the game made modifying the behavior of objects very easy. It also reduced coupling. Also, with implementing relativity between all objects in the game, now the objects will not appear too big or too small for the user's screen and the game will play fairly between differently sized devices.

## **05.06.21 Using Persistent Memory of Small Scale Applications in Mobile Apps**

**Wu, Hanyue** *University of Central Oklahoma*

**McLain, William** *University of Central Oklahoma*

Due to its three writing systems: hiragana, katakana and kanji, learning to write and read Japanese is a difficult endeavor for even the most tenacious beginner. Our team has set out to make an Android mobile application, Kanaseur, to make the task more attainable. To shorten our developing cycle, we are seeking an easier way to deal with application data. In our research, we find that using persistent memory to store and parse user information will reduce developing time and enhance program functionality.

## **05.06.22 A 3D WHEELCHAIR EMULATOR**

**Zhao,Qing** *University of Central Oklahoma*

**Fu,Jicheng** *University of Central Oklahoma*

Electric wheelchair is widely used, as it is fast, simple, and easy to manipulate. However, if a young child drives the wheelchair without any trainings, it becomes very dangerous. Since young children always want to try something new and exciting, if children can see the consequences of accidents, they will understand and choose to drive safely. We have developed a 3D wheelchair game to help young children with disabilities to improve their wheelchair driving skills. The Wheelchair looks and behaves like a real electric wheelchair. The game has stationary or moving obstacles. Children need to avoid hitting them. We designed bonus and cute cartoon characters so that children will have more interests in our game. For example, we use a little rabbit as an instructor in the practice mode. The game data, such as bonus and times, will send to our web server. According the data, a doctor can make or revise the training plan for children.

## **05.06.23 Android Programming With REST APIs: Building a Magic Companion App**

**Conyac,Ryan** *University of Central Oklahoma*

**Renfro,Derek** *University of Central Oklahoma*

**Potvin,Victoria** *University of Central Oklahoma*

The Magic Companion app was conceived as a tool to aid the avid player of Magic: The Gathering, a popular card based game. It was implemented with a desire to learn more about Android programming, especially the interaction between standard programming techniques and the use of outside APIs and frameworks. Major features desired were card search and deck-building capabilities, statistical deck analysis with an easy to understand display, rulings search, a built in copy of a rulebook, dice rolling, and a life counter. A major issue with apps of this type is the massive size of content; Magic has over 12,000 playable cards for which we needed accurate reference and pricing data. We knew we would have to heavily rely on outside APIs and frameworks, and we believed the Android framework would respond well. We found through the use of standard Android techniques, REST services, and a charting framework called MPAndroidChart that we were able to build a robust application that met our needs within a short amount of time. The only negative effect we found is the need for an Internet connection in order for the deck building part of the application to function. Yet the advantages are many: APIs means that the data adapts in real time, fragments allow for easy UI changes in the future, and self-contained API connector classes provide easier maintenance in the event the API needs to be changed.

#### **05.06.24 An Experimental Study for Evaluating the Accuracy of a Smartphone GPS App**

**Wang,Yuxuan** *University of Central Oklahoma*

**Fu,Jicheng** *University of Central Oklahoma*

We have developed a smartphone app for measuring wheelchair outdoor activities with GPS (Global Positioning System) under the Android platform. In order to balance the accuracy and battery consumption, the app uses Google Play Services as its main location entry instead of regular android method. This gives users a dynamic and alternative way to detect their current location. The distance is attained by updating the current location every second and accumulating each of such records. To improve location accuracy, we set permission as ACCESS\_FINE\_LOCATION and set the location update interval to 1000 millisecond, which gives us the highest frequency. The final positioning precision aims to locate users' positions within 10 meters error. Due to the GPS' intrinsic restrictions, this precision will enable us to conclude that our app can achieve accurate measurements for wheelchair outdoor activities.

#### **05.06.25 A System Framework Based on Smart Mobile Device and Cloud for the Rehabilitation of Knee Injuries**

**Liu,Tao** *University of Central Oklahoma*

**Fu,Jicheng** *University of Central Oklahoma*

**Qian,Gang** *University of Central Oklahoma*

Knee injuries (e.g. anterior cruciate ligament (ACL) injury) are one of the most frequent injuries in sports, which not only can cause a high medical cost, but also demand specialist assisted rehabilitation for more than 6 months. In order to decrease the cost in rehabilitation period, a patient may have to finish the protocol of rehabilitation by himself/herself, and report the progress later. However, this is obviously too subjective and may fail to accomplish due to personal preference. To address this issue, we are currently developing a system framework based on smart mobile devices and cloud computing. This system can remind the user to carry out the protocol required for rehabilitation, and capture the complete procedure by the inertial sensors in the mobile device, which is installed on the wounded leg of the patient. Then the captured data will be transferred to the cloud. Thus, the clinical specialists can know the details of the protocol fulfillment from the analysis results. As a result, the rehabilitation cost can be decreased. Currently, the preliminary experiment is still on going, but has already shown that it is possible and practical for the leg motions which were defined in the rehabilitation protocol to be clearly identified, and the captured data could be transferred to the cloud efficiently for statistics and future analysis.

## **05.06.26 Use of the Google Cloud Messaging Service in Android Application Development**

**Qian,Gang** *University of Central Oklahoma*

**Gravchikov,Stan** *University of Central Oklahoma*

This presentation introduces the concept of the Google Cloud Messaging (GCM) Service. We will establish the idea of GCM and then provide a quick implementation of a client-server app that utilizes GCM as the primary mean for notification delivery. We will cover the main components of GCM that are required for client-server communication in Android application development.

## **05.06.27 Comparison of Data Transfer Performance between HPC LAN and Hard Drive**

**Qian,Gang** *University of Central Oklahoma*

**Adebayo,Ayodeji** *University of Central Oklahoma*

With the advent of the InfiniBand network infrastructure for High Performance Computing (HPC), we are interested in investigating if transferring data into the memory can now be faster over HPC local area network than from a secondary storage device. The goal of this project is to compare data transfer performance between an HPC network and a hard drive. The project is implemented in C++; in particular, the network programming component was implemented using Boost Asio, a platform-independent library. We measure the amount of time needed to transfer a fixed amount of data based on a variety of networking scenarios and compare it with time it takes to transfer the same amount of data from hard drives. We report our findings in this presentation.

## **05.06.28 Expanded Accessibility of NASA's Space Based Sensor Data using Low-Cost Raspberry PI Clusters**

**Smoot,Devin** *Southwestern Oklahoma State University*

Objective: Increase the utility of Space Based Sensor data using automated sensor fusion tools implemented on a Raspberry Pi Bramble. Thesis: Expanding the accessibility of NASA data enables a larger community to make observations about the significance of aerosol products to life on earth. This research enables improved scientific understanding of atmospheric aerosol phenomenon through remote sensing from space, sensor validation using ground-based and airborne measurements, multi-sensor uncertainty analysis, and applications to model evaluation. By lowering the threshold of this project to a low cost cluster, it opens the door for area high schools to do research using NASA data. Methodology: This research extends the work of Charles Ichoku who developed a Multi-sensor Aerosol Products Sampling System (Petrenko 2012) to measure atmospheric aerosols. This tool has limited availability to the public and is not easily modified to facilitate further research. Providing access to this dataset and the algorithms to produce it outside of the NASA Goddard campus, more researchers at other campuses can examine and begin to analyze this valuable data set. Summary: Demonstrate Oklahoma undergraduates contributing meaningfully towards NASA research initiatives using HPC capabilities, and provide a useful dataset for further research in the field of aerosol product observations.

## **05.06.29 Identifying Relevant Attributes for Child Obesity: A Preliminary Study**

**Wiechmann,Paul** *University of Central Oklahoma*

**Fu,Jicheng** *University of Central Oklahoma*

Child obesity was found to affect 1 out of 12 children aged 2 to 5 years old in the United States in 2012. Children that are obese have been found to be more likely to be obese as adults and are at greater risk for obesity-related health problems such as cardiovascular disease, diabetes, and several types of cancer. Obesity has no single cause and is affected by many variables related to genetics, environment, and lifestyle. In this study, we apply a variety of data mining and analysis techniques, including feature selection and decision trees, to determine which variables from a large set are most relevant to child obesity. The survey data set is converted from its raw form into a format that can be used with the data mining and machine learning application WEKA. Because the number of variables is very large, related variables are separated into several categories and results are gathered for each.

## **05.06.30 Facilitating Undergraduate Research Using High Performance Computing**

**Gutierrez,Ivan** *University of Central Oklahoma*

At the University of Central Oklahoma we have many professors conducting undergraduate research. The majority of their research projects could benefit from the use of High Performance Computing (HPC), but user inexperience with HPC prevents them from doing so. But by providing users with an easy to use interface we can help faculty and students learn how to use our HPC cluster effectively, and get more done in less time. In recent years, HPC has become more powerful and easier to use. But many people still believe that it is too challenging to use, so they avoid it. It is our goal to not only teach users how to perform HPC, but to try and simplify the process as much as we can. In order to reach our goal, we are currently having help sessions where we help faculty and students learn the basics and get them started. In addition to this, we are also using a tool called Equeue which allows users to submit jobs to the job scheduler through a modern web browser. This is done through the use of premade submission templates which makes job submission a breeze. Together, the combination of these tools will simplify HPC and increase the numbers of users we have. Our help sessions can help them learn the basics of HPC and break the stigma that HPC is hard. Then through the use of Equeue, they can submit their jobs easily without having to worry about how the scheduler works.

### **05.06.31 Expanding Accessibility of NASA's Space-Based Aerosol Sensor Data using Texas Advanced Computing Center's Stampede Supercomputer**

**Nagireddy,Varun reddy** *Southwestern Oklahoma State University*

Objective: Increase the accessibility of Space Based Sensor data through the Texas Advanced Computing Center's Stampede Supercomputer available through the Extreme Science and Engineering Discovery Environment (XSEDE). Thesis: Expanding the accessibility of NASA data enables a larger community to make observations about the significance of aerosol products to life on earth. This research enables improved scientific understanding of atmospheric aerosol phenomenon through remote sensing from space, sensor validation using ground-based and airborne measurements, multi-sensor uncertainty analysis, and applications to model evaluation. In addition, this research is a catalyst for growth in the HPC skills and capabilities at SWOSU and in state of Oklahoma. Methodology: This research extends the work of Dr. Charles Ichoku who developed a Multi-sensor Aerosol Products Sampling System (Petrenko 2012) to measure atmospheric aerosols and provide a combined aerosol observation. This tool has limited availability to the public and is not easily modified to facilitate further research. The purpose of this research is to demonstrate how to expand a NASA supercomputing task to the Stampede Supercomputer. Summary: Oklahoma undergraduates contributing meaningfully towards NASA research initiatives using HPC resources through XSEDE to provide a useful dataset for further research in the field of aerosol product observations.

### **05.06.32 RX SOLUTIONS**

**Jahan,Rehana** *University of Central Oklahoma*

**Ghimire,Summit** *University of Central Oklahoma*

**Lama,Bibash** *University of Central Oklahoma*

RX Solutions, an android application, was developed as a final term project to fulfill a markets need for local non-big chained pharmacies and their customers. A simple elegant easy to use for all ages, web like design with parse database was used to build this application. The motivation behind this project was to aid small pharmacies to stay competitive in mobile customer care market. RX Solutions provides pharmacy customers to login to the custom application to do the simple tasks they usually would do by taking a trip down to the physical location. This application can be adopted by any pharmacy and it is ready to be used by simply changing the few main configurations. The main platform of this app allows users and administrator to be in a vendor-customer like relationship.

### **05.06.33 Using Applied Machine Learning to Examine Childhood Obesity in the Latino Population**

**Archer,Connor** *University of Central Oklahoma*

This study aims to examine possible causes for a rising childhood obesity rates in Latino children using survey data gathered from Latino families. We will follow a multi-step heuristic process of applied machine learning techniques by preparing, analyzing, and refining the data using an Ensemble Method to combine trends and patterns made by multiple independent models, each driven by a unique learning algorithm. This will reduce possible bias and overfitting and will lead to accurate and applicable results that will aid in reducing the growing obesity epidemic and give direction for future studies.



## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **08. Engineering**

##### **05.08.01 In vivo photothermal effects of 808 nm gold nanorods and indocyanine green on metastatic tumor model using an 805 nm diode laser**

**Hasanjee,Aamr** *University of Central Oklahoma*

**Silk,Kegan** *University of Central Oklahoma*

**West,Connor** *University of Central Oklahoma*

**Layton,Elivia** *University of Central Oklahoma*

**Bahavar,Cody** *University of Central Oklahoma*

**Doughty,Austin** *University of Central Oklahoma*

**Zhou,Feifan** *University of Central Oklahoma*

**Chen,Wei** *University of Central Oklahoma*

Non-invasive laser immunotherapy (NLIT) is being developed as a treatment method for metastatic cancer which can destroy primary tumors and induce effective systemic anti-tumor responses by combining non-invasive laser irradiation with immunologically modified bionanostructures. To further the effect of NLIT on metastatic cancer, the efficacy of non-invasive laser irradiation combined with gold nanorods (GNR), with an optical absorption peak of 808 nm, versus indocyanine green (ICG), a photosensitive dye with an optical absorption peak at ~800 nm was studied. In this study, GNR and ICG solutions were irradiated in tissue-mimic gels using an 805 nm diode laser to determine the photothermal effects of GNR and ICG. Results of these experiments furthered the development of optimal parameters for non-invasive laser power density as well as GNR and ICG dosage. Metastatic cancer cells were treated using the optimal laser power density and solution dosage parameters. Cell viability assays were used to compare the tumor-killing effect of gold nanorods paired with non-invasive laser irradiation versus ICG combined with non-invasive laser irradiation.

## **05.08.02 Creating Mathematical Models to Represent the Interactions between Rothschild Giraffes and Acacia Trees**

**Sundy,Kristina** *University of Central Oklahoma*

Rothschild giraffes are on the verge of extinction. Because of this, many are kept in conservatory enclosures. While enclosed, giraffes face different threats and hardship, including their food supply. This project is meant to be a solution to this problem. One of the goals for this project is to create mathematical models of the relationship between acacia trees and the Rothschild giraffe. We analyze the biology of these species and how they affect each other in conservatory enclosures. While in enclosures, these giraffes have a limited quantity of acacia trees available to them, resulting in the over-browsing and debarking of the trees. The acacia trees have had to adapt to the amount of browsing done by the giraffes, including a type of defense, tannin production, to keep the giraffes from browsing for too long. We develop a predator-prey model to study the interaction between the giraffes and acacia trees. We also present a model of how the tannin levels of the acacia tree affect the health of the giraffe. We plan to use these models to help conservationists with the health and wellness of the endangered Rothschild giraffe species.

## **05.08.03 Minimizing Stress Shielding in Femoral Hip Implants through Mathematical Modeling and Experimental Verification**

**Yadav,Rohan** *University of Central Oklahoma*

**Fischer,Justin** *University of Central Oklahoma*

**Grubb,Tyler** *University of Central Oklahoma*

**Huyen,Phuong** *University of Central Oklahoma*

**Antonyukov,Sergey** *University of Central Oklahoma*

**Moussa,Dr. Abdellah** *University of Central Oklahoma*

The design of prostheses used for total hip replacement (THR) is a highly complicated task due to the complex three-dimensional shape and material properties of the implant. Small differences in the aforementioned characteristics can lead to significant changes in the levels of normal stress on the fixation areas between implant, cement and cortical bone, which can lead to cement fracture in short term and fatigue failure in long term. Aseptic loosening caused by stress shielding is also responsible for total hip replacement failure for both cemented and uncemented implants. In this respect, prostheses that are extremely stiff induce high levels of stress shielding on the proximal femur and decrease interface stress there, which leads to reduction in bone density and eventually to implant loosening. In this project, we contrive to reduce stress shielding and extend the life expectancy of the prosthesis used in total hip replacement by controlling stem stiffness. This will be achieved in two phases. First, we develop a numerical technique that minimizes stress shielding over the proximal femur while maintaining a threshold level of normal stress on the fixation areas. Second, we use modeling and instrumentation to benchmark and confirm the efficiency and reliability of the proposed designs via experimentation.

#### **05.08.04 The Design and Fabrication of a Testing System for Determining the Coefficient of Kinetic Friction**

**Wagner,Nikolas** *University of Central Oklahoma*

**Torzilli,Robert** *University of Central Oklahoma*

**Xu,Gang** *University of Central Oklahoma*

The goal of this project is to design and fabricate a testing system for determining the coefficient of kinetic friction between different surfaces. This tester measures frictional forces between metal plates with different coatings and sand papers of varying grits. The system allows the simulation of frictional interactions between a metal drill tip and rocks of varying properties, a common problem in gas and oil industry. The purpose of this project is to quantify the effects of different silicon coated metals on reducing kinetic frictions. By using the tester, the coefficient of kinetic was determined by measuring the force required to pull the metal plate at a constant speed and dividing it by the total normal force of the object. A liner actuator was used to pull the plate at various constant speeds. A force gauge was used in conjunction with the actuator to measure the pulling force. A series of weights can be added to the top of the plate in order to control the normal force of the object. In a preliminary set of testing, we have determined the coefficient of kinetic friction between an uncoated metal plate and various sand papers.

#### **05.08.05 Alterations of Flagella-Driven Cellular Motility in Stressed Conditions**

**Clark,Kara** *University of Central Oklahoma*

**Xu,Gang** *University of Central Oklahoma*

**Fijalka,Daniel** *University of Central Oklahoma*

**Karpowicz,Steven** *University of Central Oklahoma*

The goal of this project is to study the correlation between the translational motility of green alga *Chlamydomonas reinhardtii* and their external physical environment. Propelled by two long hair-like flagella that beat in coordinated waveforms, each *Chlamydomonas* cell can swim relatively fast in normal medium. This current study contains two experiments; Stressor and Stressed Growth. Stressor experiments are cells cultured in 1cp medium and diluted with mediums of higher viscosities. Whereas, Stressed Growth experiments are cells cultured in mediums of higher viscosities diluted with the corresponding medium. Next, cell movements were recorded with a high-speed digital camera on a microscope, then using a custom MATLAB tracking program to trace the movement of the cell center in space and time. The average swimming velocity of each cell in different viscous medium was calculated by dividing the total distance traveled by the total time. Our data shows that cellular motility decreased with increasing external fluid resistance from higher medium viscosity. This motility change will be correlated to changes in gene expression in order to provide better understanding of the coupling between the mechanics and genetics of the flagella.

## **05.08.06 A Digital Virtual Transmission Impairment Measurement Set for EIA-232 Circuits Utilizing a Bit and Block Error Rate Test**

**Gilliam,Nathan** *University of Central Oklahoma*

**Davis,Ryan** *University of Central Oklahoma*

**Vo,Dat** *University of Central Oklahoma*

**Nguyen,Hoang** *University of Central Oklahoma*

**Miller,Ron** *University of Central Oklahoma*

**Jassemnejad,Baha** *Other*

**Rouse,Jack** *Other*

The Digital Transmission Impairment Measurement Set (DTIMS) is a device widely used in the communications industry to test the performance and reliability of digital transmissions. A digital signal transmitted through communications equipment can experience alterations due to distortion, attenuation, and jitter, thus causing digital logic levels to be incorrectly assigned. The DTIMS provides the tools needed to analyze line impairments and the information required to isolate and correct problems such as noise and data quality. We report the development a user-defined virtual instrument that advances functionality and flexibility, and improves the quality of the transmission impairment measurements in EIA-232 circuits using a bit and block error rate test. This virtual DVTIMS is a software application utilizing a graphical interface environment, National Instruments LabVIEW®, and data acquisition hardware. Implementation of this device in the communications field expedites the maintenance process of transmission lines and expands the versatility of measurement sets. Moving away from the relatively large, stand-alone devices lacking automated testing, this software based, user-defined DVTIMS with full test automation improves efficiency, accuracy, flexibility, and functionality while facilitating future upgrades and modifications through cost-effective software updates rather than hardware changes.

## **05.08.07 Anti-Missile Ballistic System Using a Pixy Camera to Track and Intercept Predetermined Objects**

**Torzilli,Robert** *University of Central Oklahoma*

**Wagner,Alex** *University of Central Oklahoma*

**Chakroun,Amer** *University of Central Oklahoma*

**Alabbad,Nasser** *University of Central Oklahoma*

**Saulnier,Abraham** *University of Central Oklahoma*

The proposed design project is a proof of concept of an Anti-Missile Ballistic System using project object identification software for acquisition and termination of a predefined object. In practice this object could be a missile or it could be a helicopter. The system will use a Pixy camera to identify, an Arduino Uno to forecast, and an airsoft launcher to intercept the target in flight. In addition the system's firing mechanism will be mounted on top of a pan/tilt servo system which will be triggered by an electronic relay and controlled by a micro controller. When the camera identifies its target, the camera assembly will rotate to that zone. The pan and tilt motors will then independently orient the gun to the appropriate angular coordinates and fire.

## **05.08.08 Flooding in Ho Chi Minh City: Causes and Sustainable Solutions**

**Vu Tran,Mai Anh** *Northeastern State University*

Ho Chi Minh City is in southern Viet Nam and is the biggest city in the country with a current population of 8 million people. The city has experienced significant growth since 1975 when the population was only 3 million. In 2015, the city had around 4.5 million tourists from the US, Europe, and other Asian countries. According to World Wildlife Fund, Ho Chi Minh City is also one of the ten cities in the world whose citizens may be significantly affected by climate change. Climate change is believed to contribute to more flooding by increasing the frequency of heavy rains, higher tidal levels of the oceans waters. Rapid economic development and urbanization in the county (especially the city) has also increased the flooding potential and increased the number of people affected by the floods. The city's infrastructure and sewage systems have not been updated appropriately since 1975 although approximately 1.5 billion USD was invested in flooding prevention in the last ten years. Therefore, the goal of this study is to analyze the causes of the flooding issue in Ho Chi Minh City and evaluate short-term and long-term sustainable solutions which are recommended by experts in and outside the country.

## **05.08.09 Sustainability Evaluation of Biosolids Land Application of Disturbed Rangelands**

**Vu Tran, Mai Anh** *Northeastern State University*

The term “biosolids” was adopted by USEPA in recognition of the plant nutritional and soil conditioning value of sewage sludges that meet the regulatory requirements specified in the 40 CFR Part 503 Rule (McFarland, 2001). Nationally, 63% of 7.1 million tons of biosolids generated are beneficially reused as fertilizer on agricultural lands (OKDEQ, 2015). In order to restore disturbed rangelands (due to overgrazing) in western Utah, three types of biosolids (lime-stabilized, aerobically digested, and anaerobically digested biosolids) were applied at rates of up to twenty times (20X) the estimated N-based agronomic rate. However, application rates of lime-stabilized biosolids were only up to 10 times (10X) the estimated N-based agronomic rate because of its low nitrogen content. The results showed that biosolids land application led to increases in vegetative growth and dry matter yield when compared to vegetation grown on control plots. The goal of this study is to analyze if land application of biosolids to reclaim disturbed rangelands was a sustainable solution and if the practice threatened human health and the surrounding environment if application rates exceeded the agronomic demand.

## **05.08.10 Induced Wound Reveals Mechanical Tension in Fibroblast-Populated Collagen Lattices**

**Law, Ting Wei** *University of Central Oklahoma*

**Tinnin, Lauren** *University of Central Oklahoma*

**Vaughan, Melville** *University of Central Oklahoma*

**Xu, Gang** *University of Central Oklahoma*

Fibroblasts play a critical role in wound healing by generating traction and contractile forces in the presence of collagen lattices. However, the magnitude and potential alterations in tension generation is unclear during normal and wound healing conditions. In this study, we created dermal equivalents that are made up of human dermal fibroblasts and type I collagen. We probed the mechanical tension in the dermal equivalent by quantifying the wound expansion after circular dissection. Finite element models were created to simulate the wound expansion and estimate the magnitude of the associated tension. Quantifying the mechanical forces and deformation generated by these fibroblasts can help us further understand the progression of cancer and diseases, tension and contraction in wound healing, and biochemical signaling of cells.

#### **05.08.11 Image analysis of hepatic steatosis to photonically assess transplantable liver**

**Jiang,Yuhao** *University of Central Oklahoma*

**zachary,josey** *University of Central Oklahoma*

Steatosis of the donor liver is a main risk factor for initial dysfunctional or non-functional graft after transplant due to fatty liver's susceptibility to ischemia reperfusion injury (IRI). A novel ultrasound-guided percutaneous single-fiber reflectance spectroscopy (SfRS) technology developed in Oklahoma State University has shown the promise in vivo to detect early increment of small-vacuole lipid that was inconspicuous to ultrasound, and to quantitate increased accumulation of large-vacuole lipid, in a rat model of hepatic steatosis induced by a methionine-choline-deficient diet. We develop and optimize image processing methods to extract lipid-size distribution and volume concentration parameters corresponding to control liver and test livers of different levels of lipid accumulation, using the high-resolution histopathology microscopy images available from animal experiments. The goal is to develop algorithmic methods that will validate the quantitateness and thereby enhance the applicability of SfRS in assessing hepatic steatosis

#### **05.08.12 Effect of Nanoparticles on the Cell Viability of Polycaprolactone-collagen Substrates**

**Barnes,Mikasa** *University of Central Oklahoma*

The goal is to determine the effect of nanoparticles that can produce a high amount of cell adhesion and cell proliferation to collagen and polycaprolactone-collagen substrates. The nanoparticle tested this term was magnesia. The results of this study will help to develop functional coating material for implants that have the ability to direct cellular responses and to regulate the formation and integration of multiple tissue types.

#### **05.08.13 Supersonic Stream from Redirected Exhaust Gas by a Convergent-Divergent Nozzle.**

**Ferron,Travis** *University of Central Oklahoma*

**Hossan,Mohammad** *University of Central Oklahoma*

The long term objective of this research is to design a jet engine that can directly recycle its exhaust gases to provide intake and compression. This allows for the elimination of expensive and complicated turbine assemblies. To achieve the long term goal, in this project we design and study a convergent-divergent nozzle that can entrain fresh air by producing a supersonic stream of redirected exhaust gas. The hypothesis of being tested is that supersonic stream produced by the convergent-divergent nozzle prevents backflow and facilitates combustion. A mathematical model is developed to simulate the flow using Navier-Stokes equations in ANSYS-Fluent platform. Several experimental models with wood and thick plastics have been developed and experiments have been conducted. Results from both mathematical and experimental models shown some promise. However refinement in the design and optimization of parameters is needed for successful repeatable results. Therefore the future goals of the project are to develop a more comprehensive mathematical model in ANSYS-Fluent platform and conduct experiments in metallic nozzles and adjusting design parameters. We anticipate that the successful results would indicate that the supersonic stream entrains enough ambient air to maintain combustion while remaining supersonic at the entrance to the combustion chamber to prevent backflow.

#### **05.08.14 Building LEGO models for understanding the mechanics of cilia and flagella**

**Johnson, Jordan** *University of Central Oklahoma*

**Xu, Gang** *University of Central Oklahoma*

In order to bridge the understanding of the structure-mechanics relationship behind ciliary motility that is critical to health and development, we designed and built in this project biomimic LEGO models that represent the complex structures of motile cilia. Using available LEGO bricks, both 2D and 3D physical models were built that include the overall assembled beams interconnected by flexible trusses and elastic rubber bands. The main goal was to recapitulate the characteristic behaviors of the microscopic cilia, particularly the 'counterbend' response. The models produced in this project will serve as an excellent educational and research tool for understanding the biology and engineering of the cilia.

#### **05.08.15 Design of a Testing Apparatus for Measuring the Wear Resistance of Nanofibers on a Cylindrical Sample**

**Lorah, Garrett** *University of Central Oklahoma*

**Khandaker, Morshed** *University of Central Oklahoma*

Electrospun PMMA fibers have been successfully spun around cylindrical models. The goals of this research were to verify the wear resistance of the fiber by designing an apparatus for testing and quantifying the wear-resistance of the coating by designing and constructing a model of abrasion testing that follows the ASTM G-174 standard. The objectives of this research were to develop a 3-D computer animated design of a scratch tester (1), construct the scratch tester by the specifications of the CAD model (2), and to use the developed machine to measure the wear resistance of nano fibers that have been electrospun on a cylindrical model (3).

#### **05.08.16 Automatic White Board Eraser and Scanner, University of Central Oklahoma.**

**Nguyen, Hoang** *University of Central Oklahoma*

**Stamper, Kyle** *University of Central Oklahoma*

**Abu-Abed, Alaeddin** *University of Central Oklahoma*

The automatic white board eraser and scanner is the combination of eraser and scanner in one unit which will scan the materials on the board and erase them after that. The machine will work on its own automatically. The goal of this project is trying to use microcontroller to control scanner and eraser at the same time, so that a professor can save all the lectures on the board and erase them afterward without physically doing anything. The first part of the project was done by using Arduino as the brain of the machine to control the eraser. In order for the eraser to stop the eraser on either edge of the board, distance sensors, HC-SR04, were used to detect where eraser should stop. To give the control of the machine to professor, Bluetooth communication device was used to control via smartphone or computer. In the scanner part, the plan is also use Arduino microcontroller to control whenever scanner should be on or off and begin to scan materials on the board. The next step in this project is trying to control the scanner and also combine it to work with eraser. The final step is to determine the quality of the file and time it take for the automatic white board eraser and scanner to finish one task.



## **05.08.17 In Vitro Mechanical Testing of Titanium-Bone scaffold**

**Sultana,Fariha** *University of Central Oklahoma*

**Vaughan,Melville** *University of Central Oklahoma*

**Khandaker,Morshed** *University of Central Oklahoma*

Metals are the most widely used implants for hard tissue repair. However, the optimal surface properties for ideal integration of a metal implant with native tissue have not yet been achieved. The objective of this research is the in vitro mechanical testing of titanium, plasma treated titanium and laser peened titanium with 3D insert scaffold. Then the osseointegration strength will be compared to determine which sample construct interface is most efficient. Cell viability tests were conducted on these three groups of samples. 3D insert scaffolds were placed on the titanium samples in silicon molds to culture the osteoblast cells 3-dimensionally for a month and the osseointegration strength was measured using a custom made tension test stage.

## **05.08.18 Design and Construction of an Inexpensive, Portable Supercomputer for Testing and Learning**

**Paynter,Bradley** *University of Central Oklahoma*

**Beadle,Corey** *University of Central Oklahoma*

**Boland,Matthew** *University of Central Oklahoma*

**Pak,Cameron** *University of Central Oklahoma*

UCO recently purchased its first computational cluster, "Buddy". As a result, there is a need to increase the capability of the university's faculty and students to use computational resources. Unfortunately, it can be very intimidating for a novice to use a piece of equipment that is expensive and vital to ongoing research. The goal of this project is to design and build a computational cluster out of inexpensive, off-the-shelf parts that is self-contained and portable. It can then be taken to classrooms, faculty offices, research rooms, etc. and used as a sandbox where people learning about High Performance Computing can experiment without fear of breaking expensive equipment or disrupting the important work of others. Issues dealt with during development have included thermal and structural analysis, efficient power and network distribution, and the core principles of cost and portability.

## **05.08.19 Numerical Simulation of Joule Heating and its Effect on Microfluidic Cell Separation Systems**

**Benton,Matthew** *University of Central Oklahoma*

**Vaughan,Melville** *University of Central Oklahoma*

**Hossan,Mohammad** *University of Central Oklahoma*

Dielectrophoresis (DEP) has become one of the most popular mechanisms for label free particle manipulations and transport in microfluidics. These devices employ electric fields to cause DEP and other electrokinetic motion. When an electric field is applied in these devices, joule heating occurs that can increase the temperature in the device. Since many of the relevant physical and electrical properties are temperature dependent, significant temperature changes can alter the efficacy of the device. In order to investigate this effect, we use numerical modelling to solve the energy, Navier-Stokes and Electric field equations using COMSOL Multiphysics. We create a model of microfluidic channels used for manipulating and separating cells and determine the temperature distribution and the effect it has on key properties used in separation. The temperature increases in the obstacle section of the channel, which we expect to result in an increase of electrical conductivity, decreased electric field strength and weaker DEP forces. We also investigate the effect of joule heating on fluid viscosity and the flow profile of the channel. This study will provide critical insight on effective design of electric field driven microfluidic cell separation devices and optimizing design parameters for cell viability and functionality.

## **05.08.20 Effect of Nano-Groove on Titanium Implant**

**Hillis,Nathan** *University of Central Oklahoma*

**Riahinezhad,shahram** *University of Central Oklahoma*

Osseointegrated features such as surface energy, roughness, and nano-groove can be fused with the implants for the osseointegration of the implant with the host tissue in orthopedics and dentistry. The effect of nano-groove on titanium implant on the bonding strength of metal/cement conducted in this research. Developing or improving of hard tissue fixation implants that have the ability of directing cellular responses between the host tissue and implant is the significance of this research. The goal of this research is the measurement of the interface bond between the implant and the cement by applying nano-groove on the surface of the implant. This study found pulling out interface fracture shear strength of the Ti-PMMA samples  $2.267 \pm 0.535 \text{ MPa}$  (3 samples) and  $0.344 \pm 0.043 \text{ MPa}$  (3 sample) for without groove. The dimension of groove depth in these experiments was  $66.039 \pm 82.604 \text{ }\mu\text{m}$ . We also conducted the effect of microgroove on the Ti surface to the bonding strength of the Ti/PMMA interfaces under fatigue test. Cyclic tests conducted to find the life of bonding of the Ti/PMMA samples at 1 Hz using 75% of fracture load as the preload that found from the static test. The bonding strength and fatigue life results compared with the control and microgroove the Ti/PMMA samples. During this study, static and fatigue tests showed that the mean value of the bounding strength of the implant with micro groove samples were significantly higher than implant without groove.

## **05.08.21 Design and Fabrication of an Intradiscal Pressure Sensor**

**Rose,Piper** *University of Central Oklahoma*

**Hodges,Kyle** *University of Central Oklahoma*

**Olheiser,Tyler** *University of Central Oklahoma*

**Camp,James** *University of Central Oklahoma*

The current treatments for patients with degenerative disc disease can be just as painful as the disease itself, but updated prosthetics have been developed that can mimic the natural state of the intervertebral discs and therefore provide a much better replacement to the spine. Our team aimed to design an affordable and durable needle-type pressure sensor that could be used to check the pressure inside of a prosthetic intervertebral disc to ensure that it is proportionate to a patient's intact disc. This allows further development in "life-like" prosthetics for spinal injuries. We have created a sensor using a parallel plate capacitor design with a fluidic center space that will output a changing capacitance depending on the pressure placed on the fluid.

## **05.08.22 Experimental Determination of Entropy Generation in Combining Fluid Flow.**

**Dorety,Adam** *University of Central Oklahoma*

**Lemley,Evan** *University of Central Oklahoma*

In this project we are expanding the knowledge of fluids engineering and fluids in micro channels by looking into the entropy generated in a rectangular junction where two flows come together, before the flow has had time to become fully combined. The project will focus only on the flow during the combination of the streams, as that is when the fluid flow characteristics are quickly changing and energy is lost due to entropy generation. This project will calculate local entropy generation rates for the experiments performed utilizing particle image velocimetry. Also in the project the Reynold's Number dependence of loss coefficient in combining flow will be found.

## **05.08.23 Flagella-Driven Motility is Maintained in Chlamydomonas Cells Grown in High-Viscosity Medium**

**Fijalka, Daniel** *University of Central Oklahoma*

**Clark, Kara** *University of Central Oklahoma*

**Karpowicz, Steven** *University of Central Oklahoma*

**Xu, Gang** *University of Central Oklahoma*

Cilia and flagella are microscopic hair-like structures found throughout various systems within the human body, and play a vital role in development and health. Defects of these subcellular structures cause a variety of human cilia-related diseases. The biflagellate alga *Chlamydomonas reinhardtii* is a model system used to study human cilia due to similarities in genetics and respective biological roles. Altering physical stimulation of the cellular environment provides insight to the interplay between structure and function of cilia. To achieve this end, algal cells were cultured in various medium viscosities and then diluted with a control media to revert or in essence “rescue” them from their more viscous growth media. To observe cellular motility, videos of the cells were immediately taken after the dilution with a high speed digital camera and individual cell motion and swimming velocities were tracked using a custom Matlab imaging processing program. Analysis of the aptly named “rescue experiment” data shows that *Chlamydomonas* flagella appear capable of maintaining average cell velocity when rescued from more viscous growth media. Combined with genetic analysis, a better understanding of the coupling between the mechanics and the genetics of the flagella and cilia can be reached.

## **05.08.24 Computer Simulation of a Microfluidic Device for Metabolite of Prostaglandin E2 (PGE-M) Separation and Concentration**

**Annalingam, saranja** *University of Central Oklahoma*

**Hossan, Mohammad** *University of Central Oklahoma*

**Gamagedara, Dr. Sanjeewa** *University of Central Oklahoma*

Cancer is the leading causes of morbidity and mortality in the world resulting 8.2 million deaths annually. One of the major challenges in the medical industry is diagnosing cancer in early stages. The biomarker proteins that are related to the malignant tumor are present so vanishingly low concentration that it is very difficult to detect. The microdevice requires low sample volumes to detect endogenous levels of low abundance proteins. A metabolite of Prostaglandin E2(PGE-M) is a urinary protein specific to the tumor promoting factor that can be used as a non-invasive biomarker for screening colorectal cancer. In this research, we develop a mathematical model to simulate isotachopheresis separation and concentration of PGE-M in a microfluidic device using COMSOL multiphysics platform. Isotachopheresis is a non-linear electrophoretic technique used in separating charged molecules based upon their electrophoretic mobility. The goal of our research is to develop a microfluidic device that is capable of separating and concentrating PGE-M using isotachopheresis. The electrical properties of virtual leading and trailing electrolytes, PGE-M and blue fluorescence protein (BFP) will be used from literature for the computer simulation. We anticipate that the simulation results will show a significant increase in concentration with distinct separation band between PGE-M and BFP. In conclusion, the proposed study will help in designing microdevices for early cancer diagnosis.

## **05.08.25 Effects of laser irradiation on target tumor temperature during laser immunotherapy**

**Doughty,Austin** *University of Central Oklahoma*

**Hasanjee,Aamr** *University of Central Oklahoma*

**Silk,Kegan** *University of Central Oklahoma*

**Pettitt,Alex** *University of Central Oklahoma*

**West,Connor** *University of Central Oklahoma*

**Zhou,Feifan** *University of Central Oklahoma*

**Chen,Wei** *University of Central Oklahoma*

Laser Immunotherapy (LIT) is a novel cancer treatment modality that has seen much success in treating many different types of cancer, both in animal studies and clinical trials. The treatment stimulates the host immune system to develop an autologous vaccine for the cancer using two main elements: the laser irradiation of a target tumor and the local injection of an immunoadjuvant. As the photothermal effect induced by the laser irradiation is not uniform across the target tumor tissue, a wide variety of cancer related biomarkers are expressed in the treatment site. Therefore, determining the temperature distribution in the treated tumor is crucial to facilitate the treatment of cancers. In this study, we investigate the levels of cellular destruction and temperature elevation caused by the laser irradiation. To do this, we injected Wistar Furth rats with metastatic mammary tumor cells. Once the tumors had grown to approximately 1-cm in one dimension, the tumors underwent laser irradiation and were monitored using thermocouple with needle probes and infrared thermography. From our study, we determined that the central tumor temperature was higher for tumors of smaller volume. Additionally, the surface temperature of the tumor had a strong correlation with the maximum infrared temperature reading.

## **05.08.26 Design and Development of Microfluidic Cell Sorting Device for Biomedical Applications**

**Locke, Travis** *University of Central Oklahoma*

**Benton, Matthew** *University of Central Oklahoma*

**Magee, Abigail** *University of Central Oklahoma*

**Walker, Nick** *University of Central Oklahoma*

**Vaughan, Melville** *University of Central Oklahoma*

**Hossan, Mohammad** *University of Central Oklahoma*

There is a growing interest in the development of microscale separation techniques. This research presents a microfluidic device for continuous manipulation and separation of fibroblast cells and polystyrene particles using direct current insulating dielectrophoresis (DEP). DEP, a nondestructive electrokinetic transport mechanism, is a technique with great potential for microscale manipulation. A microfluidic chip design was fabricated in lab which was used to manipulate and separate rat fibroblast cells. A UV-LED exposure system was designed for the photolithography stage of the chip fabrication. Samples were prepared by mixing fibroblasts cells in a sugar solution composed of 8.5% sucrose and .3% glucose in DI water with a cell concentration of  $8 \times 10^5$ . The cells were cultured using standard cell culturing procedures. The samples were loaded into the microchannel and an electric field was introduced through inserting wire into the reservoirs and observed under microscope. Results indicated manipulation towards specific outlets of both particles and fibroblasts by varying the applied voltage. A numerical model was created in COMSOL Multiphysics to simulate the electric field, cell trajectories, and the effect of Joule heating on key separation parameters. Manipulation and separation of polystyrene particles and fibroblasts are shown. This study is a step towards developing miniature cell separation systems for biomedical research and applications.

## **05.08.27 Automation of Sprinkler Systems and Irrigation Systems**

**Lamichhane, Rakshya** *University of Central Oklahoma*

**Balami, Dilip** *University of Central Oklahoma*

**Pokharel, Shibir** *University of Central Oklahoma*

**Saleh, Alaa alluohammed** *University of Central Oklahoma*

**Alkhodairi, Salman** *University of Central Oklahoma*

Our project is about automation of sprinkler system and irrigation system. The main objective of the project is to build the automatic wireless system which can determine the amount of water needed in the soil by measuring various parameters. Ultimate goal of our project is to save time, money, water and energy. Contemporary sprinkler system can't determine the required amount of water at real time. Our system can measure volumetric water content, temperature and electrical conductivity of soil and decide the necessity of appropriate water amount for appropriate time. There is wireless communication between system and the user. Sprinkler system is built by using decagon soil moisture sensor and arduino micro controller. Preliminary testing has successfully shown the desired measurement. We constructed our sample system using LED lights as sprinkler valve. We are very close to complete the project with sprinkler systems parts. Weather forecast by the system will be our next step. This system can be used to control irrigation and lawn sprinkler system in places where water is scarce.

## **05.08.28 The effects of laser immunotherapy on cancer cell migration**

**Bahavar,Cody** *University of Central Oklahoma*

**Chen,Wei** *University of Central Oklahoma*

**Lam,Ahn** *University of Central Oklahoma*

**Layton,Elivia** *University of Central Oklahoma*

**Zhou,Feifan** *University of Central Oklahoma*

Laser immunotherapy (LIT) uses laser irradiation and immunological stimulation to target all types of metastases and creates a long-term tumor resistance. Glycated chitosan (GC) is the immunological stimulant used in LIT. Interestingly, GC can act as a surfactant for single-walled carbon nanotubes (SWNTs) to immunologically modify SWNTs. SWNT-GC retains the optical properties of SWNTs and the immunological functions of GC to help increase the selectivity of the laser and create a more optimal immune response. One essential aspect of understanding this immune response is knowing how laser irradiation effects cancer cells' ability to metastasize. In this experiment, 2mm circular elastomer plugs were placed at the bottom of multi-well dishes. Pre-cancerous keratinocytes, different tumor cells, and fibroblasts were then plated separately in treated wells. Once the cells reached 100% confluence, they were irradiated by either a 980nm or 805nm wavelength laser. Separate experiments with laser irradiation plus glycated chitosan and laser irradiation plus SWNT-GC were conducted in order to further study the effects of LIT on cancer cell migration. The goal was to determine the effects of laser irradiation and immunological stimulation on cancer cell migration in vitro, paving the way to understand the mechanism of LIT in treating metastatic tumors in cancer patients.

## **05.08.29 Design and construction of a mini incubator for live cell and tissue imaging**

**Bahavar,Cody** *University of Central Oklahoma*

**Xu,Gang** *University of Central Oklahoma*

**Ramadani,Moataz** *University of Central Oklahoma*

**Bartenhagen,Chase** *University of Central Oklahoma*

**Tinnin,Lauren** *University of Central Oklahoma*

The problem with traditional incubators is that in order to image samples, they must be removed from their optimal environment, which can result in cell death or inconsistencies in results. This is where there is a need for a mini incubator, which is an incubator that is small enough to fit on to a microscope stage and provide the appropriate temperature and CO<sub>2</sub> levels in order to maintain cell viability. Many research labs with different areas of expertise could benefit from using a mini incubator, including biology, chemistry, and engineering. However, current mini incubators have several limitations. For instance, most incubators are designed for specific microscopes, Petri dishes, or cell culture plates. This would cause the researcher to either buy a different mini incubator for every microscope or cell housing, making his or her research much more costly. An optimal mini incubator would be able to fit all types of cell culture plates and Petri dishes, while also fitting under most microscopes. The goal of this project was to design and construct an affordable mini incubator that will fit under most microscope stages and incubate all types of cell housing.

### **05.08.30 Meteorological Data Collection for Three-Dimensional Forecasting Advancements**

**Foster,Nicholas** *Oklahoma State University*

**Jacob,Jamey** *Oklahoma State University*

Weather forecasting has advanced greatly with the advent of modern weather radar, but is still largely focused on macro scale phenomena. Much of the data is restricted to upper atmosphere phenomena, but the goal of this research is to develop methods to collect data at lower altitudes where severe storms begin their development through convective initiation. Data within these lower altitudes might provide insight into the formation of severe storms and allow the creation of three-dimensional weather forecasts at the meso-scale level. The purpose of the current research is to create a system that can easily be attached to an unmanned aerial vehicle (UAV) and collect meteorological data from the surrounding atmosphere. Inspired by the NCAR/Vaisala dropsonde system, a set of sensors called a sonde is being developed that is half the length and diameter of an NCAR dropsonde so that it may be equipped and deployed from a fixed-wing or multi-rotor UAV instead of needing a manned aircraft. With the use of UAVs and the Oklahoma Mesonet, this data will be accessible at any time due to routine autonomous flights and can be controlled from a distant ground station. This advancement can potentially improve severe weather warning times, saving lives and property.

### **05.08.31 Health Monitoring & Communication Devices for Smarter Hospitals & Smarter Homes**

**Estes,Robert** *University of Central Oklahoma*

**Als bou,Dr. Nesreen** *University of Central Oklahoma*

**Kim,MinSeong** *University of Central Oklahoma*

**Karsoum,Anas** *University of Central Oklahoma*

**Kembaity,Mohammed** *University of Central Oklahoma*

**Alomar,Mortahda** *University of Central Oklahoma*

Around 1% of Americans have some form of epilepsy and nearly 1 in 26 will develop epilepsy at some point in their lives. Electroencephalograms (EEG) are used to track brain wave activity in order to diagnose and treat patients with epilepsy. Current EEG devices are large which make long-term portable monitoring difficult. Our goal is to research and develop a small wearable device capable of monitoring and analyzing a patient's brain activity. This device will make long-term monitoring much easier and will aid in diagnosing, treating, and safeguarding patients that have primary generalized seizures. Since seizures cannot be triggered, we are using a proof-of-concept method in which we will monitor the temporal region of the brain and use a blinking LED as a visual stimulus to generate frequency spikes in the brain activity that can be detected in the frequency domain. This method can be adapted to detect spikes in brain activity during a seizure in the time domain.



### **05.08.32 Design of RS-232/RS-422 High Speed Converter**

**Holguin,Cesar** *University of Central Oklahoma*

**Seay,Lillian** *University of Central Oklahoma*

**Christy,Jacob** *University of Central Oklahoma*

**Crist,Jeremy** *University of Central Oklahoma*

**Fitts,Don** *Other*

**Miller,Ron** *University of Central Oklahoma*

**Jassemnejad,Baha** *Other*

An RS-232 signal is an unbalanced signal, meaning that it transmits data as high or low voltage levels by using one line. The voltage range varies between -12 and +12 volts. The RS-422 signal is a differential signal, or balanced signal, that transmits high or low voltage levels by using two lines. One line is used for the original signal and the other is used for the inverse of the original signal. This helps remove transmission error. The logic is determined by the voltage difference between the two lines which has a range of 0 to 5 volts. Both of the signals are serial signals that transmit one bit at a time. They will be converted from their respective voltage levels into transistor-transistor logic (TTL), which is how a computer communicates with its peripherals. The TTL signal voltage ranges from 0 to 5 volts. Once TTL is achieved the signal is then converted into transmission control protocol/internet protocol (TCP/IP), or packets of information, to be sent through a local area network. An immediate potential application of this device is upgrading Tower Data Link Service system.

### **05.08.33 Growing Oklahoma Native Microalgae Strains in Waste Water Generated during Hydraulic Fracturing for Natural Gas Production**

**Lutzu,Giovanni Antonio** *Oklahoma State University*

**Turgut Dunford,Nurhan** *Oklahoma Christian University*

Hydraulic fracturing is widely used for natural gas production. This process produces large volumes of wastewater (frac water) that is not suitable for safe surface disposal or reuse. Development of new remediation methods and reuse are critical for the sustainability of these operations and protection of the environment. Microalgae are able to grow in wastewater and remove excess nutrients, contaminants, and heavy metals. The main objective of this project is to develop an integrated system that will produce biomass that can be used for bioproduct manufacturing while cleaning up waste water. The specific objective is to screen Oklahoma Native microalgae strains for their growth profile in frac water. Several strains were grown in standard media, frac water and frac water + fertilizer. Algal biomass was analyzed using a Thermogravimetric Analysis (TGA) method. Microalgae grown in frac water + fertilizer produced ten times more biomass than when cultivated in raw frac water. *Tetraselmis striata*, *Dunaliella tertiolecta* and *Aphanotece* sp. produced the highest amount of algal biomass, 7.7, 7.6 and 7.1 g/L, respectively. TGA tests showed that biomass had 18.9-78.9% volatile matter, 6.3-75.8% ash and 1.8-30.4% fixed carbon. These results suggest that chemical composition of biomass varies with the strains and fertilizer addition improves biomass yields. Biomass of other Oklahoma native strains and the chemical composition of the frac water after algae growth are being evaluated.

#### **05.08.34 Stereo Vision and Navigation for Land Based Robotic Systems**

**Rymer,Nick** *Southwestern Oklahoma State University*

Our intent is to use algorithms to effectively navigate a robot through complex terrain by means of stereo vision. Stereo vision is produced by utilizing two cameras mounted on an Arduino compatible land based robot to serve as the vision sensor for navigation around obstacles. The Random sample consensus (RANSAC) algorithm will be used to filter errors from visual data acquired from cameras. Obstacle mapping will be processed with stereo algorithms through use of Matlab. Previous research has effectively proven the capabilities of implementing stereo vision with the use of RANSAC to navigate outdoor environments.

#### **05.08.35 Design and Implementation of a System to Measure Entropy Generation for Multiple Fluid Dynamics Experiments**

**Meier,Andy** *University of Central Oklahoma*

**Gillispie,Aric** *University of Central Oklahoma*

**Dorety,Adam** *University of Central Oklahoma*

**Lemley,Evan** *University of Central Oklahoma*

The main problem being addressed in our current research is the entropy generation for various flow cases that involve symmetrical combining or dividing flow cases, asymmetrical flow cases including varying flow parameters, as well as combining and dividing from perpendicular legs of a T-junction. Ultimately, the desired results will be a relationship between the entropy generation and Reynolds number for each flow case. These results can be validated analytically, using particle image velocimetry, and numerically, through simulations. Furthermore, our research seeks to address the problem of data acquisition after combining or dividing fluid. Of specific relevance is the downstream distance for a fluid to become laminar and fully developed after being disrupted by the junction. If a correlation exists between Reynolds number and flow case, this can aid in the design of systems where measurement is required after a junction. Finally, this project will serve as a framework for future work on the correlation between the entropy generation and mixing efficiencies. Currently, entropy generation can be determined using particle image velocimetry and simulated results with greater ease than mixing efficiency. Therefore, if a correlation were to emerge, then mixing efficiency in a device where mixing is necessary could be qualitatively evaluated by its entropy generation. The main applications for this research are microscale medical devices and such things as lab-on-a-chip.

## **05.08.36 Electric field driven manipulation and separation in microfluidics.**

**Walker,Nick** *University of Central Oklahoma*

**Hossan,Mohammad** *University of Central Oklahoma*

**Vaughan,Melville** *University of Central Oklahoma*

This research demonstrates manipulation and separation of fibroblast and polystyrene beads in a microchannel using electroosmotic flow (EOF) and dielectrophoresis (DEP). The channel is imprinted into polydimethylsiloxane (PDMS) using photolithography techniques. The PDMS channel is chemically bonded to glass using plasma oxidation. The channel design consists of two semicircles with three hurdle in each causing constriction of the channel. Probes placed in each of the reservoir provide an electric field in the channel generating the EOF. The cell migration in the fluid media was observed, and recorded using a camera attachment to a microscope. The resulting images allowed for the cells to be counted, and the performance of the microfluidic device to be quantified. Results shows that for certain combination of electric voltages in different reservoir, fibroblast cells can be directed to a specific reservoir. Image analysis shows that the controlled manipulation of fibroblast cells yields at least 80% specificity in the desired reservoir. The separation of fibroblast from 4um polystyrene particles in the same microfluidic device is in progress. We anticipate successful separation with similar specificity. The viability of fibroblast after exposure to electric voltages has also been evaluated. This demonstration will help to develop an integrated microfluidic cell separation system.

## **05.08.37 Design of Autonomous Collaborative Robots for Hazardous Spill Clean-Up**

**Nchinda,Hedrine** *University of Central Oklahoma*

**Harvey,Aaron** *University of Central Oklahoma*

**Mathis,James** *University of Central Oklahoma*

**Lambo-Akanbi,Ismail** *University of Central Oklahoma*

Robots are electro-mechanical devices capable of performing various tasks on command or by pre-programmed instructions. The first robot; the 'mechanical bird', was made by Archytas in 350BC and since then numerous advances in design and application have been explored especially with the increasing need for efficiency and automation in industry. Another driver for automation in the workplace is the presence of hazardous environments. Robotics offers many solutions to alleviate the dangers to workers. According to reports of chemical disasters across the world, there are ongoing concerns for safety in industry. The Occupational Safety and Health Administration (OSHA) and the Bureau of Labor Statistics (BLS) report that over 31 deaths per year are due to atmospheric hazards in confined spaces. Confined spaces are enclosed areas with limited space and accessibility, which are uninhabitable. Our goal in this project is to design and implement a group of robots capable of working together to map an area, search and locate hazardous chemical spill(s), and neutralize the hazard(s) with little or no human intervention. The maneuvering of the robots will be achieved by the simultaneous localization and mapping algorithm (SLAM), with various sensors for chemical detection, while the use of a wireless communication system will aid in robot collaboration.

### **05.08.38 3D Room Modeling Utilizing an Autonomous Robot and Various Autodesk Software**

**Saiedi, Summer** *University of Central Oklahoma*

**Skipper, Cody** *University of Central Oklahoma*

**Smith, Diana** *University of Central Oklahoma*

**Alnahwi, Hussain** *University of Central Oklahoma*

**Hughes, Charles** *University of Central Oklahoma*

Our mission is to construct a 3D CAD model of a room by mounting a camera, or cameras, to a robot that shoots photographs at set intervals. In doing so the deliverables are as follows: to determine the ideal angle and interval to take the photos for best modeling outcome, upload point cloud data to CAD (computer-aided design) software for accurate 3D modeling and dimensional analysis, design a robot with a mounted camera (or cameras) to navigate room and take photos at set intervals and to photograph a single object, create 3D model of that object, and place in 3D generated room model. The project is quite universal because CAD modeling is applicable to many different industries including real-estate, architecture and manufacturing. CAD models are easily manipulated and are very easy to share. There are various scanners on the market that create models of a room and/or an object, however the devices are quite expensive and not universal. Our ambition is to create room models in the most inexpensive way possible, utilizing cell phone and/or GoPro cameras as well as various Autodesk softwares to ensure that anyone from any industry can benefit from this project.

### **05.08.41 Probing Mechanical Stresses in Human Fibroblast Collagen Lattices**

**Tinnin, Lauren** *University of Central Oklahoma*

**Xu, Gang** *University of Central Oklahoma*

**Hilal, Mona** *University of Central Oklahoma*

**Law, Ting Wei** *University of Central Oklahoma*

**Vaughan, Melville** *University of Central Oklahoma*

Fibroblasts are one of the most abundant connective tissues in the human body. They play a critical role in wound healing by generating forces. Tension occurs naturally in wound healing, however it is unclear how much tension is generated. Quantifying the mechanical forces and deformation generated by these fibroblasts can help us study and further understand the progression of cancer and diseases and forces generated in wound healing. We created dermal equivalents by co-culturing human dermal fibroblast with type I collagen. Circular plastic mesh rings structurally supported the lattices. We added TGF- $\beta$  to some lattices to study the effect tension produced with the presence of this protein. After incubation, we probed the mechanical tension in these dermal equivalents by removing a small circle from the center of the tissue with a biopsy punch. The experiments with the 2mm perturbation results show that the punch in lattices treated with TGF- $\beta$  increased slightly faster than the lattices not treated with TGF- $\beta$ , our preliminary conclusion is that the fibroblasts produce more tension in the presence of TGF- $\beta$ . Acknowledgements: Funding for this project was provided through a grant from the Office of Research & Sponsored Programs at the University of Central Oklahoma.

#### **05.08.42 Fluorescence Labeling and Purification of Cardiac Troponin I in a Microchip**

**Morris,Shelby** *University of Central Oklahoma*

**Karpowicz,Steven** *University of Central Oklahoma*

**Hossan,Mohammad** *University of Central Oklahoma*

Cardiac troponin I (cTnI) is a protein that regulates contractions of cardiac muscles. Cardiac troponin I cTnI is considered as a highly specific biomarker for diagnosing cardiovascular diseases. The long term goal of our research is to detect cTnI in a microchip. In this project, cTnI was labeled with a florescent dye so that it can be detected under a fluorescent microscope in a microchip. The labeled cTnI will be used for subsequent research in microchip preconcentration and detection using nonlinear electrophoresis. The cTnI was labeled with Fluorescein-5-Maleimide provided by manufacturer's directions. First, a sample was prepared with 20 mM of phosphate buffer saline (PBS) at pH 7.4. A tenfold molar excess of the dye was dissolved in DMF and then added to the PBS. Finally, cTnI was added to the sample and stored in a freezer at 4°C for 12 hours. The labeling of cTnI with florescent dye has been accomplished, but evaluation of specificity is in progress. A microfluidic isotachopheresis experiment will be conducted to purify labeled cTnI by removing excess dye. We anticipate a successful purification of cTnI since the electrophoretic mobility of cTnI and fluorescent dye are different. This project will help to achieve the long term goal of microfluidic detection of cTnI.

#### **05.08.43 Separation of low abundance proteins from a serum using isotachopheresis**

**Teigland,Tucker** *University of Central Oklahoma*

**Karpowicz,Steven** *University of Central Oklahoma*

**Hossan,Mohammad** *University of Central Oklahoma*

It has been shown that preconcentration and separation of low abundance proteins can be achieved using isotachopheresis (ITP) and geometric changes in a PMMA microchannel. However, the protein serum used in these experiments consisted of proteins with all similar initial concentrations. In order for a practical device to work, higher abundance proteins must be removed from the solution prior to ITP preconcentration. For example, elevated concentrations of cardiac biomarker protein are on the order of 0.01 ng/mL and typical concentration of albumin is 35-50 mg/mL. ITP was performed on fluorescently labeled cTnI and albumin protein in a straight uniform channel. Separation was photographed and measured using fluorescent microscopy. This study shows the effectiveness of separating a low abundance protein, cTnI, from a higher abundance protein, albumin, using ITP on a PMMA lab-on-a-chip device. Using the same electrophoretic mechanism, we can separate the target low abundance protein from the serum prior to a preconcentration and detection step. This results eliminate a needed purification step prior to ITP preconcentration, and can be performed on the same chip.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **10. Forensic Science**

##### **05.10.01 Evaluation and Validation of IDenta Corporation's Bullet-hole Testing Kit (BTK)**

**Crandell, Katelyn** *University of Central Oklahoma*

Originally developed in 1982, IDenta Corporation's Bullet-hole Testing Kit (BTK) is currently being used around the world in the field of crime scene analysis, including within the United States. IDenta claims the kit can successfully be used to identify a bullet hole and determine its caliber. The kit was used to test 180 holes made by firearms and other non-firearm weapons. Though the statistical analysis of the data shows there is not enough evidence to conclude the BTK is capable of identifying a bullet hole or determining a bullet's caliber, there are additional factors that must be considered. When visual examination after proper training and upper and lower bounds for the diameters are included in the use of the BTK, the kit proves to be of value in the field of shooting reconstruction.

##### **05.10.02 Forensic Sciences Review: A New Technology, RapidHIT System, Generates Full STR Profiles in Ninety Minutes**

**Hopkins, Ashley** *Northeastern State University*

**Wang, Kevin** *Northeastern State University*

Forensic Sciences have been researched and developed over the past decades to aid in crime solving and other areas of research. There are numerous developments that have been studied to improve the science as a whole making the tasks easier and less time consuming. The new technologies, in combination with the known techniques used in this science field can make a great impact in the area of science that some seem to look past. The ability to obtain a full STR profile in such a short time frame makes it easier for convictions and having the capability of getting the guilty off the streets instead of spending numerous hours in the lab while the suspect has a chance to run free. The company that is known as IntegenX have made the impossible, possible. A System known as RapidHIT was created. This system has the ability to generate a full STR profile, in a database, in approximately ninety minutes with a cost of about \$300 per testing sample. There are numerous studies on the RapidHIT in the past five years to test its accuracy, validation and its full potential to take forensic sciences to another level.

### **05.10.03 Beyond DNA: An Epigenetic Approach to Identical Twin Identification**

**Scrivner,Coltan** *University of Central Oklahoma*

The field of forensic DNA analysis currently lacks a DNA-based method for resolving the genetic identity of monozygotic twins. Previous studies using high-throughput DNA sequencing have indicated that the analysis of variably methylated genetic loci within human genomes has the potential for discriminating between monozygotic twins. In particular, genome-wide methylation analyses have shown that CGI (C-G island) shelves show a high rate of methylation discordance between twins. In this study, the author utilizes bisulfite conversion followed by DNA amplification and capillary electrophoresis-based sequencing to analyze methylation differences between monozygotic twins at a CGI shelf. While a few studies have had success using next generation sequencing (NGS) to analyze methylation differences between twins, next generation sequencing has not been adopted by the majority of state and local forensic laboratories, or by the national FBI laboratory. Likewise, it is unknown if or when NGS machines will be commonly incorporated among state and local forensic laboratories. With more than 1 in 200 individuals having a monozygotic twin, this study provides the early work necessary to meet the forensic community's need for a practical protocol that can be used to distinguish between DNA samples from monozygotic twins.

### **05.10.04 Illicit Drug and Drug Metabolite Detection Using Latent Fingerprint Deposits**

**Smith,Elizabeth** *University of Central Oklahoma*

No one is immune to the risks of an individual driving under the influence of alcohol or drugs. According to the National Highway Traffic Safety Administration, alcohol-impaired driving has decreased between the years of 2005 and 2014 but drug-impaired driving has increased. Drivers suspected of drug-impaired driving will have blood or urine collected for toxicological testing and may undergo a Drug Recognition Evaluation (DRE). When using blood or urine, issues arise that make sampling problematic: biohazard risks, necessary training for collection of blood, and proper storage protocols. This study explores an alternative medium for illicit drug detection. Latent fingerprint deposits along with blood samples and psychophysical evaluation will be collected during the final stage of DRE training clinicals. Individuals participating in the evaluation will press his or her fingerprints to a digital livescan fingerprinting system. Upon completion of the scan the screen will be swabbed and the swab will be immersed in 25% methanol-water and the extract will be analyzed using liquid chromatography tandem mass spectrometry (LC-MS/MS). The results will be compared to the toxicological analysis of the collected blood specimen. This study will demonstrate that the simple sample preparation, lack of biohazard risk, and ease of storage makes latent fingerprints a viable medium for illicit drug and drug metabolite detection.

#### **05.10.05 The Use of Forensic Corpora In Validation Of Data Carving On Solid State Drives**

**Hegstrom, Kristina** *University of Central Oklahoma*

The need for greater focus on the validation and verification of tools has become more evident in recent years. The research in this area has been minimal. Continued research regarding the validation of digital forensics tools is necessary to help meet demands from both the law enforcement and scientific communities and to bring digital forensics in line with other forensic disciplines (as cited in Guo, et al., 2009). One of the most effective ways to perform validation and verification of digital forensics tools is to enlist the use of standardized data sets, or forensic corpora. This study will focus on the use of forensic corpora to validate the file carving function of a common digital forensics tool, Access Data's Forensic Tool Kit. The study will center specifically on FTK's ability to recover data on Solid State Drives (SSDs). The goal of this study is to both evaluate the use of forensic corpora in the validation and verification of digital forensic tools, as well as serve as a validation study of FTK's carving function on Solid State Drives.

#### **05.10.06 A Method for Validating Procedures for Interpreting DNA Mixtures Using Nichvision's ArmedXpert DNA Analysis Software**

**Gibson, Keylie** *University of Central Oklahoma*

Due to a wider variety of sample types being analyzed and increased sensitivity of analytical processes, more complex DNA mixtures are being observed by forensic DNA laboratories. To evaluate these increasingly complex DNA mixtures, more sophisticated mathematical models must be employed to provide appropriate weight to any inclusions that are made. When dealing with models that can handle the demand of increased complexity, it is necessary to establish and validate procedures for interpretation. ArmedXpert is a software program that provides tools to conduct a variety of mathematical calculations to both interpret DNA mixtures as well as assess the weight of any inclusion. A methodology for establishing and validating procedures for the interpretation of DNA mixtures using ArmedXpert was developed. The validation method sets limits to DNA mixture interpretation to insure that only meaningful information is reported. To establish an initial set of criteria and limits for interpretation, thirty known two person mixtures were evaluated by three analysts using ArmedXpert. The initial interpretation methods and limits were validated by applying the general procedure to seventy additional known two person mixtures. The result is a procedure for interpreting mixed DNA profiles of two individuals that includes interpretation thresholds, which can be used to accurately reflect the weight of any inclusion being made and ensure that any reported inclusion is not due to random chance.



## **05.10.07 Analysis of Premature Fossilization in Submerged Marine Vertebrate Remains Using Rare Earth Element (REE) Indicators**

**McElreath, Caitlyn** *University of Central Oklahoma*

**Prim, Alexa** *University of Central Oklahoma*

**King, Kama** *University of Central Oklahoma*

**Jourdan, Thomas** *University of Central Oklahoma*

**Coyer, James** *Other*

**Lord, Wayne** *University of Central Oklahoma*

Conservation organizations, governmental institutions, and enforcement agencies have avid interests in research programs targeted at enhancing the protection and preservation of marine mammals and sea turtles. Recently, examinations of marine mammal and sea turtle remains, recovered from subtidal and coastal maritime environments, have revealed signs of premature fossilization following decomposition. These seemingly atypical taphonomic changes complicate attempts at skeletal element aging and time since death estimation. Among the different elemental aspects of bone composition, Rare Earth Element (REE) is frequently analyzed as a way to measure progressive taphonomic changes and fossilization rates. The goal of our study is to measure REE composition in a variety of submerged marine vertebrate samples in order to gauge rates of fossilization in the marine environment. Skeletal remains from submerged porpoises, seals, and sea turtles will be periodically sampled and analyzed for REE composition, along with a terrestrial ungulate control, in order to explore plausible explanations for premature fossilization. Bones, recovered at necropsy, will be segregated by species and placed in subtidal cages at sampling sites in the Gulf of Maine. A broad spectrum of disciplines including ecology, oceanography, anthropology, and applied wildlife forensic science will participate in this cooperative research.

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### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **11. Genetics**

##### **05.11.01 The MAPK pathway gene expression level changes in response to quick increase of glucocorticoids in external cellular environment**

**Wu,Ning** *Southeastern Oklahoma State University*

**Holbert,Baylee** *Southeastern Oklahoma State University*

**Bourne,Hannah** *Southeastern Oklahoma State University*

**Golden,Teresa** *Southeastern Oklahoma State University*

Major depressive disorder (MDD) is a highly prevalent psychiatric disorder which is becoming a leading cause of disease burden worldwide. Past studies confirmed that hypothalamic-pituitary-adrenal (HPA)-axis hormones involved in MDD development. This study used corticosterone treated PC12 cells, a widely used in vitro neuronal model, to explore the potential target genes of MAPK signal transduction pathways in response to corticosterone stimulation and, therefore, to study the potential mechanisms of HPA-axis involved MDD development. The results showed that both live cell numbers and cellular neurite outgrowth were remarkably reduced in response to corticosterone treatments. qPCR results demonstrated that the expression levels of four target genes (MKP-1, ERK, P38, and PKC) in MAPK pathways were significantly increased after corticosterone stimulation. In conclusion, glucocorticoids stimulation can affect neuronal cell viability and neurite outgrowth due to the over expression of a group of genes involved in MAPK pathways. Among them, the over expression of MKP-1 was response to corticosterone induced neuronal cell toxicity while P38 was involved in cell death. MKP-1 can inhibit the function of ERK for neurite outgrowth. However, as the response to MKP-1 inhibition function, PKC expression was increased to maintain the level and function of ERK. The results indicate that HPA-axis abnormality may induce the gene expression level change and impact the normal neuronal function.

## **05.11.02 Sequencing of Plasmids Carrying Genes for Ofloxacin Resistance**

**de Banzie, John** *Northeastern State University*

**Bonea, Ashley** *Northeastern State University*

**Schroeder, Kayla** *Northeastern State University*

**Cisar, Cindy** *Northeastern State University*

Antibiotic resistance in bacteria presents great challenges in the healthcare field. Understanding environmental sources of resistance genes and the mechanisms behind their spread is therefore important. We are interested in resistance to the antibiotic ofloxacin, which interferes with DNA gyrase function during DNA replication. Several ofloxacin resistance mechanisms are known, including efflux pumps that expel the antibiotic and mutations in a DNA gyrase subunit gene that render it insensitive to ofloxacin. We are interested in resistance due to a plasmid-carried gene, *qnrS*. This gene encodes a protein that causes destabilization of the gyrase–DNA–quinolone cleavage complex and prevents DNA damage. Ofloxacin-resistant aeromonads were collected from sediments downstream of a wastewater treatment plant between 2007 and 2010. Strains containing plasmids bearing *qnrS* genes were identified. We have sequenced plasmids from two of these strains using primer walking. Plasmid pT2Sofl-9 is 7973 np long and plasmid pT2Sofl-122 is 7621 np long. The two plasmids differ at only two positions: a short region upstream of *qnrS* and a one nucleotide indel. In addition to *qnrS*, both contain genes for plasmid replication and mobilization. We compare our plasmids to other *qnrS*-bearing plasmids obtained at different locations and dates. These data show global dissemination of *qnrS*-bearing plasmids over many years.

## **05.11.03 Cancer genes in *Drosophila melanogaster* can be expressed in colon tissue and produce different levels of malignancy.**

**Underwood, Nicholette** *Northeastern State University*

**Farrar, Justin** *Northeastern State University*

**Ahlander, Joseph** *Northeastern State University*

Bioluminescence is light produced by chemical reactions inside of organisms. Using the expression of the luciferase gene as a bioluminescent reporter, tumor growth in colon tissue of *Drosophila melanogaster* can be quantified. The amount of light produced directly correlates with the mass of tissue present, and therefore the growth or overgrowth of tissue. Our purpose is to develop models of colon cancer in *Drosophila* that can be manipulated for study. A screen of cancer genes was used to identify candidates that show excessive proliferation when expressed in colon tissue. A select number of cancer genes affecting the PI3 Kinase, Receptor Tyrosine Kinase, Notch, and a few other signaling pathways produced a high level of malignancy. Genes that affect PI3 Kinase and Receptor Tyrosine Kinase pathways produced the highest malignancy levels while genes affecting cell cycle pathways had little to no measured effect. The oncogenes in this experiment are important for continued study because the signaling pathways they affect are conserved in humans. By developing these models, we can develop a better understanding of how outside stimuli, such as change in diet or treatment with therapeutic drugs, affect oncogenesis in these pathways in colon tissue. This knowledge of these conserved pathways can be applied to human cancer.

#### **05.11.04 Investigation of Possible PilR-Regulated Promoters in Myxococcus xanthus**

**King Jr.,Troy** *Oklahoma State University*

**Ladd,Kayla** *Other*

*Myxococcus xanthus* is a predatory bacterium that goes through multicellular development and spore formation. Significantly, *M. xanthus* utilizes Type IV pili motility to control important developmental processes. Many of these processes are regulated by two-component signaling systems (TCS). In *M. xanthus*, Type IV pili motility is regulated by the PilSR TCS. In the PilSR TCS, PilR is a response regulator that binds within the promoter region of pilA and upregulates the production of PilA. Reports have shown that PilR from other organisms may regulate additional genes. Therefore, we hypothesize that PilR may also recognizes other promoter regions with a similar sequence upstream of their respective genes to aid in motility. Previous research in the Kirby Lab identified a putative PilR consensus sequence in the promoter region of pilA. From this sequence upstream of pilA, it was compared to other sequences within the *M. xanthus* genome via Patter Locator. The promoters of interest were isolated and ligated upstream of lacZ for  $\beta$ -galactosidase activity assays. The lacZ plasmid was transformed into both WT (DZ2) strains and PilR lacking ( $\Delta$ pilR) strains. The  $\beta$ -galactosidase activity assay showed a significant level of activity in promoters of mxan\_4844 and mxan\_7415. Mxan\_4844 appears to be negatively transcribed in the presence of PilR while mxan\_7415 appears to be positively regulated by PilR. Our results suggest that PilR may regulate other genes to aid in motility

#### **05.11.05 Novel Functional Mutations in GCKR Affect Triglyceride Concentrations in Diabetes**

**Sapkota,Bishwa** *University of Oklahoma*

**Mussa,Huda** *University of Oklahoma*

**Hopkins,Ruth** *University of Oklahoma*

**Hillis,Nathan** *University of Central Oklahoma*

**Sanghera,Dharambir** *University of Oklahoma*

**Whitby,Paul** *University of Oklahoma*

Dyslipidemia is a well-known risk factor for cardiovascular disease and type 2 diabetes (T2D). Despite high heritability (50-80%) of lipid traits, genome-wide association studies have only been able to account for a fraction of this heritability (<10%) in genes for lipid metabolism. Here, we performed targeted sequencing of 14 candidate genes (~215 kb) for 940 individuals with diabetic dyslipidemia [572 high serum triglycerides (TG) cases (>150mg/dl), and 368 low TG (<100mg/dl) controls] from the Asian Indians Diabetic Heart Study. Of the 2361 high-quality variants analyzed, 953 variants (40%) were unique to high TG cases, and 321 variants (13.6%) were unique to controls. Thirteen functionally damaging and deleterious rare mutations were identified within the glucokinase regulatory protein (GCKR) gene. The GCKR inhibits glucokinase (encoded by GCK) by forming a complex, which plays a role in the control of blood glucose homeostasis. The lead variant with a missense mutation of Serine/Asparagine was restricted to few cases and more than 60% of the carriers were diabetic and 90% of carriers had high TG (ranging 182-560 mg/dl). However, this variant was absent in large (n=48,689) multiethnic exome consortium data. We are currently testing phenotypic effects of this variant to evaluate in vivo metabolic consequences in a transgenic zebrafish (*Danio rerio*). Taken together, our findings have the potential to find novel pathway for diabetes linked with hypertriglyceridemia

## **05.11.06 Assessing the Utility of Microsatellite Markers in Identifying Geomys Species in Central Oklahoma and the Oklahoma Panhandle**

**Coffman, Cristina** *University of Central Oklahoma*

**Haynie, Michelle** *University of Central Oklahoma*

The goal of this project is to utilize genetic markers to address the distribution of members of the genus *Geomys* (pocket gophers) in Oklahoma. Specifically, what are the distribution boundaries of *G. bursarius* (plains pocket gopher) and *G. breviceps* (Baird's pocket gopher) in Central Oklahoma and does *G. jugossicularis* occur in the Oklahoma panhandle? A boundary between *G. bursarius* and *G. breviceps* in central Oklahoma was proposed based on cranial measurements. Additionally, a contact zone between the 2 species was identified in Norman, Oklahoma. A third species has been suggested, *G. jugossicularis*, to occur in the Oklahoma panhandle. Genetic data will be used to reassess the proposed boundary line and the known contact zone, as well as to confirm the identity of samples collected in the panhandle. We used 9 microsatellite markers to analyze specimens from central Oklahoma and the panhandle to identify unique genetic clusters. Data obtained from specimens will be compared to samples collected from within the well-defined ranges of the 2 species (western Oklahoma— *G. bursarius*; southeastern Oklahoma —*G. breviceps*) to ensure correct identification and to account for the possibility of hybridization. Preliminary data has identified 3 distinct clusters of pocket gophers in Oklahoma, 2 in central Oklahoma and a 3rd in the panhandle. Admixture between the 2 clusters in central Oklahoma suggests the possibility of hybridization between *G. bursarius* and *G. brevic*

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **12. Kinesiology**

##### **05.12.01 Hemispherectomy: The Progression of Motor Skills with Physical Therapy Intervention**

**Markwardt, Kelly** *Tulsa Community College*

Hemispherectomy: The Progression of Motor Skills with Physical Therapy Intervention Purpose: To determine the effect of physical therapy and the progression of motor skills in patients with a history of a hemispherectomy. Methodology: Observe a patient who has had a left hemispherectomy and track the patient's motor skill progress for approximately 24 months while he undergoes physical therapy interventions. The researcher will attend therapy appointments to track progress as well as have access to physical therapy records and other pertinent medical records. His progress will be compared to typical developmental milestones. The patient's progress will also be compared to other patients of various ages who have had a hemispherectomy. Results: The patient is a two year old male who was born with Tuberous Sclerosis and began having uncontrollable seizures at three weeks of age. At two months of age he had a left hemispherectomy, which entailed the left side of his brain being removed. This resulted in decreased control and coordination of his right upper and lower extremities. In October 2014, patient's motor skills are delayed for his age when compared to the Centers for Disease Control developmental milestones chart. As of January 2016, the patient is walking.

## **05.12.02 Acute Effect of Self-Myofascial Release of the Rectus Femoris on Vertical Jump**

**Seale,Jeremy** *University of Central Oklahoma*

**Clark,Jamie** *University of Central Oklahoma*

**Redus,Brady** *University of Central Oklahoma*

Self-myofascial release (SMR) is the process of applying pressure to the soft connective tissues that encase muscles (fascia) in order to relax them. Fascia tightness can have adverse effects on performance. Common ways to apply the pressure are foam rollers, lacrosse balls and the newly designed MobilityWOD Supernova. They have recently been included in many pre and post-workout plans due to their usefulness in increasing range of motion (ROM) without decreasing power. The ability to increase power without using energy can be vital in competition. The purpose of this study is to measure the effects of self-myofascial release of the rectus femoris on a vertical jump. Two groups of athletes (one control, one experimental) will be tested after a standardized dynamic warm up. Both groups will jump twice on a Just Jump mat, which will calculate their vertical jump, and then another two times after a 10 minute rest period. The experimental group will be using the Supernova for self-myofascial release during this 10 minute rest period. Results will be compared between the control and experimental group. A significant increase in power output and performance should be witnessed due to self-myofascial release.

## **05.12.03 Static Vs. Dynamic Stretching**

**Mendoza,George** *Northwestern State University*

**Mahieu,Jennifer** *Northwestern State University*

**Collins,Leslie** *Northwestern State University*

**Little,Stephanie** *Northwestern State University*

Stretching is a big part in preventing the body from injury while performing exercises. Since elementary school, it has been taught to perform a certain stretch for fifteen to thirty seconds then release. Well, according to our article, certain stretches must be performed depending on the type of goal one is trying to achieve. Static and dynamic stretching are two different forms of stretches designed to accomplish two different goals. Research shows that the traditional static stretching, which involves holding a stretch for a certain amount of time and releasing, is more goal oriented to increasing flexibility. If static stretching is performed before some sort of athletic event, research shows that it decreases performance. Dynamic stretching is more goal oriented to increasing performance. Dynamic stretching consist of flexing and extending a muscle slowly and gradually increasing speed until muscles are warmed up. Although both may have their advantages and disadvantages, both play a vital role in staying healthy and fit.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **13. Mathematics**

##### **05.13.01 Oligopoly**

**Argyros, Ioannis** *Cameron University*

**Panta, Sagun** *Cameron University*

Oligopoly is a state of industry where firms produce homogeneous goods (or close substitutes) and sell their products in a homogeneous market. We present some existence and uniqueness of equilibrium results in oligopoly markets. The results also relate the equilibrium problem to fixed point problems and nonlinear complementarity problems.

##### **05.13.02 Competition between a nonallelopathic phytoplankton and an allelopathic phytoplankton species under predation**

**Kengwong-Keumo, Jean-Jacques** *Other*

We propose a model of two-species competition in the chemostat for a single growth-limiting, nonreproducing resource that extends that of Roy (2009). The response functions are specified to be Michaelis-Menten, and there is no predation in Roy's work. Our model generalizes Roy's model to general uptake functions. The competition is exploitative so that species compete by decreasing the common pool of resources. The model also allows allelopathic effects of one toxin-producing species, both on itself (autotoxicity) and on its nontoxic competitor (phytotoxicity). We show that a stable coexistence equilibrium exists as long as (a) there are allelopathic effects and (b) the input nutrient concentration is above a critical value. The model is reconsidered under instantaneous nutrient recycling. We further extend this work to include a zooplankton species as a fourth interacting component to study the impact of predation on the ecosystem. The zooplankton species is allowed to feed only on the two phytoplankton species which are its perfectly substitutable resources. Each of the models is analyzed for boundedness, equilibria, stability, and uniform persistence (or permanence). Each model structure fits very well with some harmful algal bloom observations where the phytoplankton assemblage can be envisioned in two compartments, toxin producing and non-toxic. This work advances knowledge in understanding the crucial functions of allelopathy in food webs.



### **05.13.03 Sports Betting in the NFL: Are the Winners Experts or Lucky?**

**Norris, Caleb** *University of Central Oklahoma*

Sports betting markets provide a unique opportunity to test market efficiency and in this case, study the presence of experts in forecasting sports outcomes. Research on sports betting experts is important because of its similarity to that of a financial analyst and how “expertly” they select stocks or investments. Can top financial analysts outperform the rest of their competition by selecting well-performing investments? This paper uses a unique panel data set of individual NFL sports bettors in a season long contest known as the Las Vegas SuperContest. The contest is used to track the picks of bettors against the spread on games throughout the 2014 NFL regular season. This paper tests if the leaders in the contest are experts in sports betting or just experiencing a short-term lucky streak. For example, do the top 20% of bettors at the midway point of the season outperform the bottom 80% of over the last half of the season? Results from a single week of picks in the last half of the season indicate that there is no significant difference between the win percentages for the top performers and the remaining contestants. However, when examining the last half of the season as a whole, there is a significant difference between their win percentages. These results indicate that expert sports bettors can be identified over longer time horizons.

### **05.13.04 Sequences of Line Graphs**

**Balch, Brenden** *University of Central Oklahoma*

**Lane-Harvard, Liz** *University of Central Oklahoma*

**Milligan, Thomas** *University of Central Oklahoma*

A graph is a mathematical object that consists of two things, a set of edges and a set of vertices. A tree is a graph that has at least two vertices, and each vertex is connected by at least one path. Line graphs of trees will be of interest for us. Simply put, we construct line graphs by associating edges from the original graph with vertices of our new line graph. New edges are then determined by the adjacency of the edges of the original graph. There is very little known about sequences of vertices on line graphs. Our goal with this project is to construct such sequences. We will try to put these sequences in closed form. With this, we will be able to determine the number of vertices of the  $n$ th line graph of certain trees. We currently have results for the sequence of line graphs of a star graph, and we will continue to work on variations of star graphs.

### **05.13.05 The Existence of Solutions for a Class of Even Order Differential Equations**

**Brumley, Daniel** *University of Central Oklahoma*

**Hopkins, Britney** *University of Central Oklahoma*

**Karber, Kristi** *University of Central Oklahoma*

**Milligan, Thomas** *University of Central Oklahoma*

We outline a method for proving the existence of positive solutions to an even order differential equation satisfying right focal boundary conditions. Beginning with a transformation of the even order boundary value problem into a system of second order differential equations satisfying homogeneous boundary conditions, our method culminates in successive applications of the Guo-Krasnosel'skii Fixed Point Theorem to produce the desired result.

### **05.13.06 The CCA Urban ACT Prep Program**

**Brumley, Daniel** *University of Central Oklahoma*

**Lawrence, Jacintha** *University of Central Oklahoma*

**Hopkins, Britney** *University of Central Oklahoma*

**Karber, Kristi** *University of Central Oklahoma*

Many studies show a positive correlation between ACT scores and level of family income. In the Oklahoma City Public School district, for instance, students from low-income families tend to have lower scores than students from average income families. In 2014, students from Douglass Mid-High School, which is based in a historically low-income area of Oklahoma City, scored 3 points lower than the district's average. To combat this problem, the CCA Urban ACT Prep Program was formed in 2015. The project seeks to prepare prospective college students for the mathematics portion of the ACT exam by providing tutoring sessions tailored to meet college readiness standards. In this poster, we present a preliminary report based on a semester of work with the students.

### **05.13.07 A Comparison of Robust Linear Regression Methods**

**Li,Hong** *Cameron University*

**Poudel,Abhaya** *Cameron University*

**Kengwoung-Keumo,Jean-Jacques** *Cameron University*

Background:Linear regression is one of the most popular and widely used models for analyzing the effect of explanatory variables on a response variable. Linear regression has widespread applications in various fields of study such as biomedicine, finance, economics, environment science and physics. The Ordinary Least Squares (OLS) method has been generally adopted to estimate the regression parameters. However, the presence of an outliers and/or influential observations greatly reduces the accuracy of parameter estimates of OLS method. Robust regression methods such as LTS-estimate, S-estimate, M-estimate and MM-estimate were proposed and have been used in the presence of outliers. Tabatabai et. al. introduced a new model, TELBS robust regression method, in 2012. Objectives:The study aims to compare the accuracy of TELBS estimates of regression parameters in comparison with OLS, LTS, S-estimate, M-estimate and MM estimate in the presence of outliers. Method:We identify the outliers using diagnostic graphs and measures. We compare the performance of TELBS estimates with other robust methods estimate using one real data set which contain outliers. We used R and Mathematica for all computations and simulations. Results:MM-estimate and TELBS method perform better than other approaches for the data set examined in this study. The parameter estimates obtained by TELBS method are very close to those obtained by OLS with the absence of outliers in the data set.

### **05.13.08 Working with Mathematical Deficiencies through ACT Preparation**

**Schnelle,Natalie** *University of Central Oklahoma*

**Bayles,Esther** *University of Central Oklahoma*

**Hopkins,Britney** *University of Central Oklahoma*

**Karber,Kristi** *University of Oklahoma*

The CCA Urban ACT Prep Program was originally designed to assist low-income students by preparing them for the Mathematics portion of the ACT. Initially, we (UCO tutors) created ACT practice exams to help gauge the high school students' proficiency level. Through the results, we found that the younger high school students did not understand basic mathematical concepts fundamental to success on the ACT. Therefore, we created new material that focused on preparing the younger students for the Algebra I EOI. In addition, we used innovative tutoring techniques to address these issues. We are observing promising results each week we see the students.

### **05.13.09 Traveling Wave Solutions of Infectious Diseases Model**

**Yoon,Jeein** *Cameron University*

Infectious diseases are caused by pathogens and are spread from person to person through coughing, sneezing, exchange of bodily fluids, etc. Epidemic diseases such as the Asian flu, polio, and the ongoing HIV/AIDS epidemic have had devastating effects globally. Mathematical models developed of these infectious diseases can be used to better understand the spatial spread and the minimum speed at which these diseases can spread from region to region. The objective of this research project is to find a traveling wave solution of an infectious diseases model and later fix upon a specific infectious disease. Analytical solutions of the SIR model have been solved and a system of diffusion type partial differential equations involving a spatial domain and time have been developed. Solving this system of PDEs, the minimum speed at which the infectious disease spreads has been established.

### **05.13.10 Cellular Models of Canine Parvovirus**

**Myers,Brittany** *University of Central Oklahoma*

Parvovirus is a virus that infects actively dividing cells in many animals, including dogs. Canine Parvovirus type 2 (CPV2) has two forms, intestinal and cardiac, which often kill young dogs when they become infected. We built differential equations models to better understand how CPV2 infects host cells. The model includes viruses, infected cells, target cells, protected cells, and antibodies. Since there are multiple ways antibodies inhibit infection, we built two different models to study the different types of antibody response. Based on our model results, we propose the most effective method for fighting off CPV2 after infection.

### **05.13.11 Hermite Polynomials**

**Clymer,Maranda** *East Central University*

We investigate the  $n$ -dimensional Hermite polynomials. Beginning with the general multivariate normal, we will build the most general Hermite Polynomials. This process starts by taking partial derivatives. Once we have taken partial derivatives, we are able to define the Hermite polynomials. Then, we are able to calculate for different values of  $n$ . If we take  $n$  partial derivatives, we then get one entry for an  $n$ -tensor. We examine multiple properties of the polynomials, such as their orthogonality and symmetry. Finally, we restrict the Hermite polynomials to one-dimension. With the assumption of mean zero and standard deviation one, we recover the traditional Hermite Polynomials.

### **05.13.12 Explorations of Complex Transformations**

**Godfrey,Micah** *East Central University*

A transformation, in reference to mathematics, is a general way to describe a change in a point, a line or a shape. Transformations among the set of real numbers can be explained rather easily, both algebraically and visually, but transformations among the set of complex numbers can become quite complicated. This is in part due to complex numbers having two components: a real component and an imaginary component; while a real number has only one component, which is the number itself. Using complex numbers, we will investigate the changes that take place to a straight line under a polynomial transformation. In this investigation, we will explore loops, changes in direction, twists, intercepts, points of intersection, and different angles that are created by these polynomial transformations. We will use visual representation as well as algebraic representation to show the different changes made by these transformations within the set of complex numbers.

### **05.13.13 Comparison of Numerical Solutions of Black-Scholes Option Pricing Model.**

**Joshi,Ayush** *Cameron University*

**Kadel,Gokul** *Cameron University*

**Thapa,Narayan** *Cameron University*

**Brown,Bethany** *Other*

**Philip,Timothy** *Other*

We studied the Solve-It Math Game, which is a math twist on Connect Four. There are many differences between this game and Connect Four, the most important being that numbers are meaningful rather than colors. We determined which scores are possible and which scores are impossible to achieve, and we studied whether or not there is a playing strategy that guarantees a win to a particular player. We found that the decisive factor is whether a player goes first or second.

### **05.13.15 Optimal Routing of Crude Oil Truck Transport from Well to Depot**

**Paynter,Bradley** *University of Central Oklahoma*

**McCoy,Liliya** *University of Central Oklahoma*

Oklahoma has always been rich in oil, leading to rise of hundreds of companies drilling oil-producing wells. Modern technologies (i.e. horizontal drilling) lead to great increase in oil production, however, there is not enough oil pipeline available to get the oil from the well site to the refineries. When pipelines are not available in the area, oil companies employ the services of the trucking industry to get the oil where it needs to go. Usually several trucking companies will bid for the right to haul oil from the well to the drop sites and the oil companies will pick the best rates for them. The well sites have a holding tank (central tank battery) which typically holds 400 barrels of oil, once the tank battery reaches a certain number of barrels, the trucking company gets a call informing them that the oil is ready for pick up at the specific site. The driver of the truck chooses where to take a load of oil. The question arose of whether the trucking companies are choosing a route that is of minimum cost to the oil company. This question is explored through integer programming and preliminary results are presented.

**05.13.16 Optimizing Strategic Decisions in "Settlers of Catan" using Linear Programming**

**Paynter,Bradley** *University of Central Oklahoma*

**Blanton,Corrin** *University of Central Oklahoma*

**Grounds,Chad** *University of Central Oklahoma*

**Legg,Peyton** *University of Central Oklahoma*

**Pak,Cameron** *University of Central Oklahoma*

**Steele,Kyle** *University of Central Oklahoma*

**Washburn,Shane** *University of Central Oklahoma*

**Fulkerson,Michael** *University of Central Oklahoma*

We investigate a generalization of the factorial function, called the gamma function, and we show how it can be used to derive hypervolume and surface area formulas for a ball of radius  $r$  in  $n$ -dimensional Euclidean space. A peculiar result is that the hypervolume of the unit ball is greatest in dimension 5.

**05.13.18 Maximizing Guaranteed Value in a Fair Division of a Cake under Piecewise-Linear Valuations.**

**Payne,Brandon** *Cameron University*

**Fulkerson,Michael** *University of Central Oklahoma*

**Balch,Brenden** *University of Central Oklahoma*

**Papayik,Jason** *University of Central Oklahoma*

Some real improper integrals that are difficult or impossible to evaluate using ordinary calculus techniques can be evaluated using residue theory from complex analysis. We examine these techniques and provide some of the mathematical background, including Laurent series, the residue theorem, and their historical development. Finally, we give some concrete examples.

## **05.13.20 The Riemann Hypothesis - A Historical Examination**

**Fulkerson,Michael** *University of Central Oklahoma*

**Sharp,Christopher** *University of Central Oklahoma*

The celebrated Riemann Hypothesis is considered by many mathematicians to be the most important unsolved problem in mathematics. We examine the historical background of the problem, including its connection to the Prime Number Theorem, as well as contributions from Euler, Gauss, Riemann, Hilbert, and others. We also investigate more recent modes of attack on the problem.

## **05.13.21 Arcs and Strongly Regular Graphs**

**Lane-Harvard,Liz** *University of Central Oklahoma*

Various generalized quadrangles have been constructed from ovals, hyperovals, and  $q$ -arcs in Desarguesian projective planes. The concurrency (and collinearity) graph of a generalized quadrangle is a strongly regular graph. Thus, each of the above generalized quadrangles is associated with a strongly regular graph. Removing the hypothesis that the plane is Desarguesian, we construct strongly regular graphs with the same parameters as the concurrency graphs of the generalized quadrangles arising from ovals, hyperovals, and  $q$ -arcs.

## **05.13.22 Fair Division of a Shareable Good**

**Wimer,Natalie** *Cameron University*

In a classic fair division problem, a resource (such as a cake) must be divided among multiple people to ensure that each person receives their fair share. Some resources, such as time or money, can not only be divided, but can also be shared, meaning that a portion can be assigned joint ownership or allocated in a mutually agreeable way. Each person may receive a portion all to his- or herself, while some other portions may be jointly owned by multiple people. We assume that joint ownership of a portion of the resource results in a proportionally lower satisfaction than sole ownership. We consider a problem of how best to divide a shareable resource between two people to ensure both people receive a fair level of satisfaction.

### **05.13.23 Predicting Clinical Treatment Outcome with Mathematical Models of a Novel Cancer Immunotherapy**

**Laverty,Sean** *University of Central Oklahoma*

**Dawkins,Bryan** *University of Central Oklahoma*

The benefits of using lasers and immune stimulants to initiate a systemic anti-tumor immune response have been known for years. In successful treatments, immune cells work together to destroy all primary and metastatic tumors and cured patients develop long-term immunity against tumors. However, a major obstacle to successful treatment is the suppression of the anti-tumor immune response by pro-tumor regulatory T cells (Tregs). Though the exact immune mechanism responsible for antitumor activity is not entirely known, we have proposed an immune response that relies on antigen-presenting dendritic cells and tumor-killing cytotoxic T cells. The treatment is characterized by three essential factors: laser irradiation, a light absorbing dye, and an immune stimulant called glycated chitosan (GC). Our dynamical model is based on work done with the DMBA-4 metastatic mammary tumor line in rats. Treatment outcome is related to the strength of pro-immune stimulatory effects of GC and with the strength of pro-tumor Treg activity. We will show how clinical outcomes change as a function of these two competing forces and use our results to suggest useful experiments that may further improve treatment success.

### **05.13.24 Analyzing Neuron Dynamics with Mathematical Models**

**Laverty,Sean** *University of Central Oklahoma*

**Kalantari,Farzan** *University of Central Oklahoma*

Using a system of differential equations, we describe the behavior of neurons. Neurons communicate through action potentials created by highly regulated fluctuations of ion concentrations. We describe the dynamics of voltage and gating strength, where ion-gated channels are used to close or open pathways for the flow of ions. The axon of a neuron is covered by a myelin sheath, keeping the neuron insulated to ensure rapid current flow. There are gaps along the myelin sheath, the Nodes of Ranvier, where the ion-gated channels reside; thus, the action potential must be reproduced at these nodes to continue signal propagation. By extending the FitzHugh-Nagumo neuron model, we developed a model which incorporates action potential propagation along the axon and can be used to study neural function in demyelination disorders.

### **05.13.25 Asymptotic Behavior of the Prime Counting Function**

**Fulkerson,Michael** *University of Central Oklahoma*

**Alasafr,Hussain** *University of Central Oklahoma*

The Prime Number Theorem (PNT) states that the number of primes less than a given value  $x$  is asymptotically equal to  $x/\log(x)$ . The PNT was conjectured by Gauss when he was 15 years old, but it was finally proved over 100 years later (in 1896) by Hadamard and de la Valee-Poussin. We explore the history of the PNT as well as results related to the prime counting function, the logarithmic integral function, and the zeta function.



### **05.13.26 Parameter Estimation Problem in Projectile Motion.**

**KARKI,NISHAN** *Cameron University*

**Rana,Jashmon** *Cameron University*

**Thapa,Narayan** *Cameron University*

Identification problems are one of the oldest most important problem in mathematics and engineering. Because of their applications in medical imaging, underground prospecting, nondestructive testing, astronomical imaging, image processing, remote sensing, and data mining, the Business, Industry, and government (BIG) sectors are very interested in applied inverse problems. In this project, we work on a simple yet powerful identification problem for projectiles. In particular, we are interested in finding the optimal angle for launching a projectile to maximize the distance it travels. In order to accomplish this, we develop a system of second order initial value type model. The system of second order initial value problems will be solved by using ordinary differential equations routine. In addition to this, functional related with predicted and observed data will be established and minimized over the space of admissible set of parameters. MATLAB routine will be used to estimate parameters.

### **05.13.27 Parameter Estimation Problem in Projectile Motion**

**Rana,Jashmon** *Cameron University*

Identification problems are one of the oldest most important problem in mathematics and engineering. Because of their applications in medical imaging, underground prospecting, nondestructive testing, astronomical imaging, image processing, remote sensing, and data mining, the Business, Industry, and government (BIG) sectors are very interested in applied inverse problems. In this project, we work on a simple yet powerful identification problem for projectiles. In particular, we are interested in finding the optimal angle for launching a projectile to maximize the distance it travels. In order to accomplish this, we develop a system of second order initial value type model. The system of second order initial value problems will be solved by using ordinary differential equations routine. In addition to this, functional related with predicted and observed data will be established and minimized over the space of admissible set of parameters. MATLAB routine will be used to estimate parameters.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **14. Optometry**

##### **05.14.01 Effective Management Techniques: Preparing for Private Practice**

**Whisenhunt, Mandi** *Northeastern State University*

**Medlin, Laura** *Northeastern State University*

**Shetler, Joseph** *Northeastern State University*

**ABSTRACT Purpose.** Analysis of current practice management courses at 14 United States colleges of optometry was performed by conducting a survey. Data determined how effective methods prepared students for practice management in private practice. Results will assist practice management educators better prepare optometric students. **Methods.** A nine-question survey was conducted among optometrists who had graduated within the last ten years. Practice settings of subjects included private practice, corporate care, institutional (Veterans Affairs, Indian Health Services, military facilities), and academia. The survey was sent to American Optometric State Associations and U.S. Colleges of Optometry. Physicians ranked common instructional techniques according to the perceived benefit of each. **Results.** One hundred and nine current practicing optometrists participated. An average of two practice management courses are currently offered at U.S. Colleges of Optometry. A majority (52.29%) of participants' perceived being adequately prepared for private practice at their graduation, while 44.95% felt unprepared. **Conclusion.** The results of this study, based on the survey results and interpretation of multiple prior publications, concluded that effectively preparing optometry students for private practice includes utilizing different resources. The survey data revealed the most effective techniques analyzed were lectures by optometric guest speakers and business consultants.

## **05.14.02 InfantSEE: Scoping Out the National Application of This Public Health Program**

**Zinser,Ashley** *Northeastern State University*

**Brewer,Allison** *Northeastern State University*

**Proctor,Alissa** *Northeastern State University*

**PURPOSE.** Developed by the American Optometric Association, InfantSEE is a program that provides infants, ages 6 to 12 months, a no-cost, comprehensive eye exam to ensure adequate visual abilities. Untreated vision disorders can lead to developmental delays and learning barriers, contributing to poor school performance. Reasons behind those not participating in the program are explored in an effort to help guide the AOA in program improvements. **METHODS.** A 22 question survey was distributed to alumni of U.S. optometry schools and U.S. optometric state association members. The survey addressed InfantSEE providers and non-providers. **RESULTS.** 572 optometrists participated. 81.56% felt qualified to perform infant exams, but only 55.69% of participants are currently InfantSEE providers. The most prevalent reasons for not becoming providers were feeling that optometrists are devaluing the profession by not billing for services, current practice modality, and being uncomfortable in providing infant care. **CONCLUSION.** Many participants praised InfantSEE and how it helps children. Others criticized it due to it being a no-cost service, as well as lack of promotion and public awareness. Struggles persist with growing the program to support the 4 million babies born per year, keeping up with the Affordable Care Act changes, or continuing to educate optometrists on providing care to infants. We hope InfantSEE can utilize this information to continue program growth and development.

## **05.14.03 Water Intake Effect on Tear Osmolarity**

**Pham,Bao-Tran** *Other*

**Billings,Cecilia** *Northeastern State University*

**Salmon,Thomas** *Northeastern State University*

**Introduction.** Doctors recommend water intake to treat dry eye, assuming that whole body osmolarity affects tear osmolarity. This remains unproven and mechanisms for this process are unknown. Studies indicate that drinking water decreases plasma osmolarity and thereby tear osmolarity, but other research shows that plasma osmolarity is not easily altered. We hypothesize that increased water intake will not significantly decrease tear osmolarity within the first few hours. **Methods.** After overnight fasting from food and drink, we measured baseline tear osmolarity for both eyes of 20 subjects. They then consumed 30 oz of water within 30 minutes and TearLab measurements were repeated at 30 minutes, 2 and 3 hours post baseline. A modified SANDE questionnaire assessed symptoms before and after treatment. **Results.** No statistically significant change was found between baseline tear osmolarity and the two- and three-hour post-treatment measurements, however a significant decrease was observed immediately post-treatment. Subjective symptoms revealed no statistically significant change post-therapy. **Conclusion.** Following overnight fasting, reducing whole-body hydration to a minimum, the water dose caused a small transient decrease in tear osmolarity. However, within hours, homeostatic mechanisms returned osmolarity to baseline. Short-term whole body hydration did not produce a lasting improvement in tear osmolarity or subjective symptoms.

#### **05.14.04 Effect of Lipid Based Artificial Tear Use on Hyperosmolarity**

**Fisher, Lana** *Northeastern State University*

**Klingelhofer, Nerissa** *Northeastern State University*

We assessed and compared the efficacy of three commercial lipid based artificial tears at treating meibomian gland dysfunction by using TearLab tear osmolarity measurements as our primary diagnostic indicator in addition to the Ocular Surface Disease Index (OSDI), the TearScience SPEED Dry Eye Questionnaire and Oculus Keratograph meibomian gland assessments. We randomly assigned 45 participants, recruited from a pool of students, spouses of students, faculty, and staff at Northeastern State University Oklahoma College of Optometry, one of three lipid based artificial tears (Systane Balance, Refresh Optive Advance, or OcuSoft Retaine MGD) for use four times a day over the course of four weeks. At the first visit, subjects completed the OSDI and the Dry Eye Questionnaire. Meibomian gland assessment and baseline tear osmolarities of both eyes were obtained that visit. Subjects were then scheduled to return to the testing facility for a four-week follow-up visit to repeat the Dry Eye Questionnaire, obtain tear osmolarity values of both eyes and repeat meibomian gland assessment. We found no statistically significant difference between Systane Balance, Refresh Optive Advance, or OcuSoft Retaine MGD at decreasing tear osmolarity. All three lipid based tears showed an overall decrease in dry eye symptoms; this was further attributed to the placebo effect of using an eye drop. Meibomian gland structure stayed consistent throughout the one-month trial within all three study groups.

#### **05.14.05 Spectacle wear and self-perception in children with accommodative dysfunction**

**Harrie, Marc** *Northeastern State University*

**Barnwell, Jordyn** *Northeastern State University*

**Purpose.** To determine whether near variable-focus lens wear affects children's self-perception when compared to traditional, lined bifocal lenses for treatment of accommodative dysfunction. **Methods.** A randomized, single-masked trial was conducted. 10 subjects with accommodative dysfunction were randomly assigned to test groups for full-time spectacle wear: traditional, lined bifocal lenses and HOYA Sync near-variable focus lenses. Participants completed the Self-Perception Profile for Children prior to receiving lenses and after 45 days of full-time spectacle wear. Data was analyzed utilizing two-tailed paired t-tests. **Outcomes included** Global Self-Worth, Physical Appearance, Athletic Competence, Scholastic Competence, Behavioral Conduct, and Social Acceptance SPPC subscales. **Results.** Physical Appearance ( $p < 0.03$ ) was reduced following traditional, lined bifocal wear. Social Acceptance ( $p < 0.05$ ) was greater for near variable-focus lens wear. Physical Appearance ( $p = 0.16$ ) and Global-Self Worth ( $p = 0.35$ ) trended toward greater for near variable-focus lens wear. No other statistical differences or trends were identified. **Conclusion.** Individuals fit in near variable-focus lenses are likely to note improved physical appearance and social acceptance compared to traditional, lined bifocals. Eye care practitioners should consider the social consequences of prescribing lenses. Choosing the most appropriate vision correction for children may improve compliance.

#### **05.14.06 Higher Order Aberrations in Air Optix Colors vs. Air Optix Aqua Soft Contact Lenses**

**Molinar,Nancy** *Northeastern State University*

Purpose. The aim of this study is to compare higher order aberrations (HOAs) through Air Optix Colors and Air Optix Aqua using the Shack-Hartmann aberrometer. It is unknown what effect the color has on these contact lenses, but it is important to find out because they are the most breathable colored contacts on the market. Methods. Shack-Hartmann wavefront sensing technology with the Zeiss i.Profiler@plus was used to measure HOAs present in the two eyes of 15 subjects while wearing Air Optix Aqua contact lenses and comparing that to Air Optix Colors. These measurements took place with a natural pupil and a 3mm and 5mm analyzing standard was used when gathering data. Total HOA Root Mean Square (RMS) values were used to compare statistical significance between the two lenses. Results. Air Optix Colors lenses induced a higher statistically significant amount of HOAs when compared to Air Optix Aqua. Discussion. The statistics found a significantly increased amount of HOAs induced by the Air Optix Colors contact lenses when compared to their clear counterpart. Further studies that include other subjective testing such as visual acuity, contrast sensitivity, scotopic vision, color vision, and patient feedback are needed to assess clinical significance.

#### **05.14.08 Correlation Between Gastrointestinal Disorders and Glaucoma**

**Clay,Hillary** *Northeastern State University*

**Galbraith,Katie** *Northeastern State University*

**Schmoker,Megan** *Northeastern State University*

**Miller,Jeff** *Northeastern State University*

We compared glaucoma patients with non-glaucoma patients to determine if there was a correlation between glaucoma and gastrointestinal disorders. Risk factors have been theorized, but the exact mechanisms of glaucoma are still unknown. One mechanism that has not been fully researched is the bi-directional communication between the gut and the brain. Through this pathway, gastrointestinal disorders may be contributing to the pathology of neurodegenerative diseases like glaucoma. We conducted a chart review in the Northeastern State University Oklahoma College of Optometry's electronic health record system, Compulink. This review consisted of 81 randomly selected glaucoma patients with 81 non-glaucoma patients. The differences between sets was evaluated using an odds ratio and a Pearson's chi square. Of the glaucoma subjects, 25.9% had IBD or a related medication and of the control group, 22.2% had IBD or a related medication. Following the statistical analysis of the data, the risk of having irritable bowel disease (IBD) was slightly higher for the subjects with glaucoma but was not statistically significant. These findings indicate further research is indicated to study the role the bi-directional pathway between the gastrointestinal system and the central nervous system plays in glaucoma.

## **05.14.09 Effect of Sodium Consumption on Tear Osmolarity Measurements**

**Voigt, Kevin** *Northeastern State University*

**Cox, Alichia** *Northeastern State University*

**Purpose.** The purpose of our research was to preliminarily test whether ingesting a meal containing higher than normal dietary salt quantity than what is recommended by the World Health Organization would significantly alter tear osmolarity as measured by the TearLab® instrument. We hypothesize increasing systemic levels of sodium will also increase tear film sodium postprandial, thus increasing tear osmolarity. **Methods.** Initial tear osmolarity measurement (preprandial) was taken on each eye of the subject. The subject then consumed the provided high sodium meal. Additional measurements were taken postprandial at thirty minutes, two hours, and three hours on each eye. Subjects self-reported current height and weight. A standard BMI equation was used to calculate each subject's BMI. **Results.** Average tear osmolarity decreased over time and reached minimum value at 2 hour postprandial instead of increasing as expected. Overall, there was no significant difference between preprandial and postprandial measurements. Subjects with higher BMI values had higher than average tear osmolarities. The high BMI subgroup also had a significant change in tear osmolarity over time. **Conclusion.** Tear osmolarity seems to be affected by dietary sodium consumption, though opposite than hypothesized. Increasing dietary sodium intake is not a valid treatment option for DED; however, decreasing an individual's BMI may decrease a person's tear osmolarity which may decrease the com

## **05.14.10 Settling Time of Two Jupiter™ Scleral Lens Diameters**

**Greene, Jessica** *Northeastern State University*

**Cook, Sarah** *Northeastern State University*

**Lighthizer, Jenna** *Northeastern State University*

**Pack, Latricia** *Northeastern State University*

**Purpose.** As scleral lens designs gain popularity, it is important to have more standardized methods for evaluating lens fit and to better understand lens settling rates and amounts in order to more efficiently fit these lenses. This study will evaluate the settling rates for two diameters of Jupiter™ lenses. **Methods.** A study of Jupiter™ lens settling in 15.6mm and 18.2mm diameters was performed. Subjects were fit using fitting sets in the NSUOCO contact lens clinic. One eye of each subject was fitted with each scleral lens designs over separate visits. After inserting lenses into each patient's left eye, settling amounts were measured at 3 minutes, 15 minutes, 30 minutes, 45 minutes, 1 hour, 2 hours, 4 hours, and 8 hours. Clearance values were measured using a Zeiss Visante™ Optical Coherence Tomographer. **Results.** On average the Jupiter™ 15.6 design and Jupiter™ 18.2 design settled a total of 73.3 µm and 120 µm, respectively. The majority of lens settling occurred between initial lens insertion and the 4-hour measurement. **Conclusion.** Settling time varies between lens designs. It is difficult to precisely predict the amount of settling each lens will have due to differences in the corneo-scleral junction. Our study and data analysis shows a majority of settling occurs between initial fit and the 4-hour measurement. Settling does still occur after the 4-hour time, and will likely occur throughout the wearing of a lens.

#### **05.14.11 Visioffice Interpupillary & Segment Height Measurements vs Traditional Methods**

**Tomasu, Kevin** *Northeastern State University*

**Dunn, Evan** *Northeastern State University*

Popularity of free-form lenses has increased the need for more precise positioning of spectacle lenses. The purpose of this study was to determine the comparability and repeatability of the Essilor Visioffice system's interpupillary (PD) and segment height measurements to gold standard methods. Thirty optometry school participants were enrolled and measured. Investigators measured binocular and monocular PDs by mm ruler and pupillometer. Their seg heights, for right eye only, were measured using a mm ruler. All measurements were then repeated using the Visioffice system. Measurements were repeated three times on all participants. For this study the corneal reflex pupillometer and mm ruler were considered the gold standard for PD measurements and seg height measurements, respectively. A standard, pre-adjusted frame was used on all patients. Bland-Altman analysis of the binocular PD measurements was performed. The intra-class correlation coefficient (ICC), a measure of repeatability, was 0.99 for the monocular PD measurements using the Visioffice (OD, OS). They were 0.98 and 1.0 for the pupillometer, OD and OS respectively. There was not a statistically significant difference between seg height measurements by the Visioffice and mm ruler by paired t-testing ( $p=0.13$ ). Neither the Visioffice nor mm ruler provided repeatable measurements of seg height.

#### **05.14.12 Decreased Parvocellular Input and Its Effects on Depth Perception**

**Ayres, Brian** *Northeastern State University*

**Simon, Scott** *Northeastern State University*

**DeRosier, Wes** *Northeastern State University*

**Purpose.** This experiment was conducted in an attempt to better understand the magnocellular pathway's function as it relates to humans' ability to coordinate vision and to accurately interact with an object in space. By blocking the subject's central vision, we decreased the input from the parvocellular pathway, allowing us to study the magnocellular system as the primary system used for judging the distance and spatial location of a target. **Methods.** Subjects were asked to toss a beanbag into a bucket from 10 feet away, 10 times with central vision occluded and 10 times without any occlusion. Subjects were randomized into two groups, one who performed the task with central occlusion first, and another who performed it without central occlusion first. Our experimental group consisted of 17 subjects. **Results.** Our results showed no significant difference in performance between the trial with central occlusion and the trial without central occlusion. **Conclusion.** Although our subjects' performance was essentially the same with and without central occlusion, this may be either (a) a result of small sample sizes, or (b) subjects may have used primarily magnocellular input whether or not central vision was blocked. Further studies are needed, possibly including trials with peripheral vision occluded, to determine whether this is the case.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **15. Pharmacy**

##### **05.15.01 Pertussis Booster Vaccination**

**Cansler,Megan** *Northwestern State University*

**Collins,Leslie** *Northwestern State University*

**Mahieu,Jennifer** *Northwestern State University*

**Carter,Claressa** *Northwestern State University*

Pertussis, also known as whooping cough, is a highly contagious respiratory disease, caused by the bacterium *Bordetella pertussis*. Although preventable by a vaccination we receive in five doses as a child; pertussis causes nearly three hundred thousand deaths in child annually. The authors wanted to find if we completed our vaccinations as a child then why do we need a booster when becoming pregnant or when around small child? The thought process was that like other disease, such as measles, we receive the vaccinations as a child and are protected throughout adulthood; shouldn't pertussis have the same concept? Our research results suggest that post vaccination duration of immunity ranges from four to twelve years. Researchers are suggesting that adults receive a pertussis booster every ten years.



### **05.15.03 Evaluation of the Immediate Impact of Relaxation Techniques on Student Psychological and Physiological Health**

**Leffler,Emma** *Southwestern Oklahoma State University*

**Lockyear,Nicholas** *Southwestern Oklahoma State University*

**Lajaunie,Angelica** *Southwestern Oklahoma State University*

**Kelley,Heather** *Southwestern Oklahoma State University*

**Mouliom,Aminatou** *Southwestern Oklahoma State University*

**Burgess,Gwen** *Southwestern Oklahoma State University*

**Burgess,Melinda** *Southwestern Oklahoma State University*

**Appeddu,Lisa** *Southwestern Oklahoma State University*

The Accreditation Council for Pharmacy Education has incorporated a new objective in addressing stress mitigation. This study investigates the acute impact of relaxation techniques on student psychological and physiological well-being by evaluating changes in (1) self-reported levels of stress and anxiety, (2) salivary components which measure stress, and (3) student perceptions of relaxation techniques. Pharmacy and Pre-Pharmacy students (aged 18 years or older) will be randomly assigned to one of five treatments. These include three relaxation interventions (body scan, mindfulness, or 4 x 4 meditation) and two comparators (power posing or app gaming). In a private setting, each subject will (1) provide a pre-treatment salivary sample, (2) complete surveys assessing pre-treatment stress and anxiety levels, plus provide initial perceptions regarding their treatment, (3) perform the assigned treatment, (4) complete post-treatment surveys, and (5) provide a post-treatment salivary sample. Salivary samples will be analyzed using commercial kits (Salimetrics, LLC) for cortisol and alpha-amylase as indicators of stress. A minimum of eighty subjects will be recruited. We expect relaxation techniques to lower post-treatment stress and anxiety levels more than comparators. Accordingly, we hypothesize subjects will have improved perceptions toward conducting relaxation techniques. The ultimate goal is to change attitudes regarding the benefits of relaxation in future pharmacists.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

### **16. Physics**

#### **05.16.01 Attenuation Coefficient Studies in a Polyacrylic Solid Using the Slope Method**

**Williams, Karen** *East Central University*

Previous findings revealed that the attenuation coefficient in liquids was not reproducible. Ultrasound attenuation coefficients in publications vary significantly from one another. This research utilized the slope method to obtain the ultrasound attenuation coefficient in solid polyacrylic. The temperature and frequency dependence of the coefficient was also studied as a variable that might cause a problem in reproducing the attenuation coefficient. An echoscope interfaced to a PC with 1, 2, and 4 MHz transducers produced a graph of amplitude versus distance via A-scan software. The amplitude of the original wave and the echo in polyacrylic objects of fixed size was measured for six polyacrylic objects. Bouguer's Law and Graphical Analysis was used to calculate the natural log of the ratio of wave to echo and calculate the slope. The attenuation coefficient obtained was 0.1679 dB/mm for 1MHz, 0.1673 dB/mm for 2MHz, and 0.2259 dB/mm for the 4MHz transducer. The coefficient obtained when data was taken in colder temperatures was always slightly less than the coefficient taken in a warmer room, but was not outside the uncertainty of the slope. The frequency dependence on coefficient was also examined.

#### **05.16.02 GRB-SNE 150518a at Different Wavelengths**

**Apala, Elizabeth** *East Central University*

**Soderberg, Alicia** *Other*

**West, Michael** *Other*

Gamma Ray Burst (GRB's), extremely energetic flashes of Gamma Rays, are caused by either deaths of massive unstable stars or colliding binary neutron stars. A unique burst, GRB 150518a, had two recorded bursts fifteen minutes apart which is very rare and is considered to be ultra-long, lasting around thirty minutes total and is associated with a Supernova explosion. Gamma rays are emitted by supernovae, neutron stars, black holes, and quasars and by studying GRB's it allows us to see more deeply into how these objects function. The first few days of GRB 150518a's detected afterglow was plotted in different wavelengths, including optical, x-ray, radio, and infrared, in flux versus time. Data is continuously being added as time goes on.

### **05.16.03 Affective and Emotional Composite Temperament Scale: Study on the validity of the measure**

**Scott, Jenn** *University of Central Oklahoma*

Introduction Research on the Affective and Emotional Composite Temperament (AFECT) Scale seeks to provide an adaptive and complex self-report scale for clinicians to allow for a more integrative approach to long-term emotional and affective states (Lara, Bisol, Brunstein, Reppold, Carvalho, and Ottoni, 2011). The AFECT scale identifies 12 affective temperaments to be used as a basis for diagnosis. The present study seeks to further validate the AFECT scale. Method The present study will recruit participants through the University of Central Oklahoma, and participants will receive class credit in exchange for participation. Each participant will be presented with the AFECT self-report scale. Each participant will also receive the PANAS (Watson, Clark, and Tellegen, 1988) self-report scale, a successfully validated measure that seeks to establish elements of mood. The present study will administer both scales to each participant. After a week to two week break, participants will return and take both measures again. Discussion The results will be measured for consistency across the time span, and a measure will be taken between the PANAS and AFECT to assess consistency. Discussion will focus on the implications of a self-report scale considerate of long-term temperament in relation to clinical assessment. Keywords: personality, PANAS, AFECT, mood, clinical psychology, temperament

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **17. Psychology**

##### **05.17.01 Nonlinear Dynamical Systems in Visual Search**

**Haws,James** *University of Central Oklahoma*

**Shirali,Yasmin** *University of Central Oklahoma*

**Vanhoy,Mickie** *University of Central Oklahoma*

##### **05.17.02 Resilience, Stress, & Autonomic Flexibility: A Polyvagal Perspective**

**Haws,James** *University of Central Oklahoma*

**Ray,Angelica** *University of Central Oklahoma*

**Jeyaraj-Powell,Tephillah** *University of Central Oklahoma*

Objective: Approximately 80% of the population is likely to experience a traumatic event sometime during their life; however, only a relatively small percentage actually develops a mental disorder. This study will examine psychological resilience in relation to autonomic functioning, indexed using electrocardiogram data to assess heart rate variability. Hypothesis: Higher levels of resilience are expected to be related with increased heart rate flexibility following a laboratory stressor, thus indicating great autonomic flexibility with which to regulate negative emotion, which is characteristic of resilience. Methodology: Participants will be connected to the ECG using 3 Ag-AgCl electrodes attached to the chest and abdomen. Participants will be instructed to be still and quiet while resting baseline is recorded. Participants will complete a 9 minute stress-inducing math task on a desktop computer. Post-stress resting activity will be assessed for 10 minutes then participants will be disconnected from the Biopac. Summary: This study will ostensibly unite the various characteristics within resilience by implicating a fundamental, physiological unifier - autonomic flexibility.

### **05.17.03 Hand Proximity Facilitates Visual Guidance and Recognition**

**Haws,James** *University of Central Oklahoma*

**Scott,Jenn** *University of Central Oklahoma*

**Vanhoy,Mickie** *University of Central Oklahoma*

Objective: The purpose of this study is to examine if hand position facilitates object perception. Objects nears hands are likely important. Research has examined the effects of hand proximity on response time and accuracy in hull haptic-visual task, no analysis has been made concerning finer-grained structure of performance. Methodology: Participants completed 120 dual taks trials while maintaining steady patter of right-hand motion whilst simultaneously identifying English characters presented on a computer monitor positioned above the desk via an articulating monitor arm occluding participants' hands. Visual task responses were recorded from the left hand. The visual task included a a reticle that remained visible a the center of the screen while stimuli briefly appeared on the left or the right side of the reticle before being replaced with a mask. The staircase procedure was applied as needed to maintain a 75% correct identification rate. One each trial, a cue notified the participants to move the mouse from the right to the left side of the monitor. Another cue, 1200 ms later, cued the participant to return the mouse to the starting position. During that time, the characters appeared either in the lower left or right of the screen before being masked. Summary: The data were analyzed with the procedure Wavelet Transform Modulus Maxima, a way to measure fractal dimension of a time series.

### **05.17.04 Haptic Control of Eye Movements**

**Haws,James** *University of Central Oklahoma*

**Scott,Jenn** *University of Central Oklahoma*

**Vanhoy,Mickie** *University of Central Oklahoma*

Objective: Eye-hand coordination is crucial to many important tasks. A Nonlinear Dynamical Systems approach assumes that eyes and hand are interacting facets of one complex oculomotor system in which physiological and task constraints interact to shape overall system behavior. Because of difficulty of collecting data from multiple people at the same time, few have tried it but we expect to be able to collect eye-movement dat during coordinated tasks in order to tease apart truly independent processes. Hypothesis: We expect to se increased complexity of joint tasks to be represented in larger exponents, meaning more dimensions are required to model the behaviors. Methodology: Participants were paired together to complete the study. Participants eye movements were measured via corneal and pupillary reflection using and Eyetribe. A handheld camber captured thumb movements of each participant. Participants played FIFA16 together and were given an opportunity to practice with the Wiimote. Participants were told the purpose of the game was to score as many goals as possible and win the game together. Summary:Eye movement and hand movement time series data were analyzed with nonlinear statistical methods in search for evidence of multi fractal structure. Multiple Holder exponents were obtained for both conditions, indicating that eye and hand movements were multi fractal.

### **05.17.05 Children's Vulnerability to Homicide, Abduction, or Infanticide Correlates with the Seasons**

**Sherwood, Heather** *University of Central Oklahoma*

**Mather, Robert** *University of Central Oklahoma*

Routine Activities Theory has documented that perpetrators use an organized and meticulous thinking process when selecting a victim. Likewise, majority of perpetrators know their victims, and crime scenes can look dramatically different depending on the age of the children. These criminal events are a major sociological issue that needs to be understood and combated against. Archival data from Google may provide media trends that take place as well as the seasons that children are more vulnerable. Results from the current research, show that fall tends to be when children are most vulnerable and winter is when children are least vulnerable. If societies can recognize who are likely victims, who the typical perpetrators are, and when these awful crimes tend to occur, crime rates will decrease.

### **05.17.06 The Effect of Racial Bias and Societal Norms on Eyewitness Testimony**

**Nesmith, Blake** *University of Central Oklahoma*

**Hancock, Thomas** *University of Central Oklahoma*

The purpose of the current research is to investigate how jurors reason in courtroom deliberations regarding eyewitness testimony. Previous research has not provided consistent results concerning the influence of racial bias in courtroom decisions (Mitchell, Haw, Pfeifer, & Meissner, 2005). It has also been noted that when an individual engages in counterstereotypical behavior, they typically experience negative reactions from others (Bosson, Prewitt-Freilino, & Taylor, 2005). However, the impact of violating racial stereotypes has not been fully investigated (Phelan & Rudman, 2010), especially in terms of courtroom proceedings. This study examines the influence of racial bias and violation of societal norms on jury decision-making. Participants will view two mock testimonies, one by a male and one by a female. In addition to gender, ethnicity of the witness will also be manipulated (e.g., testimony one might be read by a black male and testimony two by a white female). Participants will use two adjustable Likert scales to rate the believability and likability for each video, followed by a final verdict. We predict racial bias will affect the believability, likability, and overall verdict, but the ratings for the counterstereotypical testimony pairs will be impacted more so when compared to the conforming testimonies.

### **05.17.07 Testimonial and Distributorship Information Persuade College Multi-Level Marketing Targets**

**Sherwood, Heather** *University of Central Oklahoma*

**Mather, Robert** *University of Central Oklahoma*

We examined social cognitive factors that affected the receptiveness of college multi-level marketing targets to a persuasive message, including manipulated components of a sales pitch. Types of information influenced targets' familiarity with MLM and affected beliefs that MLM is a desirable model for consumers to purchase products.

## **05.17.08 Addiction Resistance: A Study of the Oklahoma Health Patterns Project**

**Hoffmeister, Jordan** *University of Oklahoma*

**Cohoon, Andrew** *University of Oklahoma*

**Lovallo, William** *University of Oklahoma*

Some individuals are resistant to alcohol use disorders despite high levels of intake. Addiction Resistance (AR) measures the disparity between alcohol consumption and alcohol use disorder symptoms; such that, individuals with higher AR exhibit fewer symptoms despite higher intake. Factors contributing to AR are not well understood. The aim of this study was to predict AR based on variables related to risk for addiction that are measured in the Oklahoma Family Health Patterns Project. Participants were healthy young adults ( $n = 844$ ) who were given measures of mood stability and risk taking tendencies, and were interviewed to determine alcohol intake, alcohol use disorder symptoms, and family history of substance use disorders (FH). AR was calculated using maximal lifetime intake and number of alcohol use disorder symptoms. A multiple linear regression analysis was run to determine which variables were the most predictive of AR. FH, neuroticism, impulsive antisociality, and sociability explained a significant amount of the variance of AR (adjusted  $R^2 = .10$ ,  $F(5, 838) = 19.86$ ,  $p < .001$ ). Emotional stability, risk avoidance, and norm adherence were found to be positively related to AR, while FH was negatively related. Individuals who are emotionally stable, norm adherent, risk avoidant, and have fewer family members with substance use disorders are more resistant to alcohol use disorders despite higher alcohol intake.

## **05.17.09 Manipulating Blink Rate May Influence Response Times on Visual Tasks**

**Shirali, Yasmin** *University of Central Oklahoma*

**Haws, Kyle** *University of Central Oklahoma*

**Vanhoy, Mickie** *University of Central Oklahoma*

**Scott, Jenn** *University of Central Oklahoma*

People blink for reasons besides to remove irritants and distribute tears; we blink when disinterested. If spontaneous blinks mark points of attentional disengagement as suggested, then manipulating blink rate may influence response times to visual stimuli. My hypothesis for this study is that rate of blinking will affect response times on a visual task. Increasing participant blink rate is expected to produce faster response times and higher accuracy than reducing blink rate. If we can find differences in performance due to blink rate, perhaps we can detect and modify undesirable blink rates (e.g., sleepy drivers or surgeons).

### **05.17.10 Directionality of Difficulty and Task Type Effect Response Time for a Visual Search**

**Abbott,Deah** *University of Central Oklahoma*

This experiment explores how difficulty directionality (increasing, decreasing, and random) and task type (simple, go/no-go, and choice) interact to affect mean reaction times (RT) for specific stimuli in a visual search. This relationship is viewed through the lens of Cognitive Load Theory and a rational decision-making framework in a within-subjects counterbalanced design. Stimulus difficulty was manipulated through increasing the distractor quantity and decreasing the opacity of the target and distractors. Cognitive Load Theory predicted response time to increase as stimulus difficulty increased. A rational decision-making framework predicted to find that these six variables explain a significant proportion of variance in response time for each stimulus in all nine conditions. The experiment supported the hypotheses. Better understanding how these commonly used tasks affect an individual is imperative.

### **05.17.11 Hand-eye coordination self-organizes during tasks within nonlinear time series analysis**

**Scott,Jenn** *University of Central Oklahoma*

**Haws,Kyle** *University of Central Oklahoma*

**Shirali,Yasmin** *University of Central Oklahoma*

**Vanhoy,Mickie** *University of Central Oklahoma*

Here we present a novel analysis of cognitive load after stimulus onset asynchrony (SOA) by measuring hand-eye coordination. Integrated time series analysis (TSA) effectively established relationships between variables. Through this method we confirm order within a chaotic system and support previous non-linear assumptions quantitatively.

### **05.17.12 Improving Older Adults' Simulated Driving with Positive Age-Stereotype Priming**

**Newton,David** *University of Central Oklahoma*

Older adults are at greater risk of accidents while driving than middle-aged adults due to age-related changes in physical and cognitive function. With older adults being projected to represent a greater proportion of American road users in coming years, it is important to identify factors that predict older adults' accident risk while driving. Presenting words associated with advanced age to older adults at speeds below the threshold of comprehension (i.e., subliminal age-stereotype priming) has been shown to affect physical and cognitive functioning—fundamental predictors of driving ability. The present study tested the effect of subliminal age-stereotype priming on driving performance of adults aged between 50 and 85 years using a low-fidelity driving simulator. It was predicted that positive age-stereotype words would increase performance and negative age-stereotype words would reduce performance. Participants were tested of driving performance before and after completing a computer-based positive age-stereotype priming task, negative age-stereotype priming task, or control task. This study provides ecological implications for human factors and social psychology regarding the influence of stereotyping older adults on road-traffic safety.



### **05.17.13 “Gayming” All Night Long: Outness and Social Support of LGBT Gamers – Update**

**Everson,Adam** *University of Central Oklahoma*

**Limke,Alicia** *University of Central Oklahoma*

With the availability of online gaming and the social relationships that can thereby develop, lesbian, gay, bisexual, and transgender (LGBT) players may use game play to develop strong, healthy social support systems. Thus, this study examined this connection in a sample of 169 LGBT individuals. Participants completed a variety of questionnaires assessing LGBT oppression, experiences/emotions associated with their sexual orientation, coping strategies, outness, symptomatology, and social support. Results suggest that time spent per week in online games (e.g., League of Legends and World of Warcraft) is negatively associated with outness and positively associated with feeling unsafe because of one's sexual orientation; coping through self-distraction, behavioral disengagement, and self-blame; feeling that it has been a difficult process accepting one's sexual orientation; and overall symptomatology. However, feelings of rejection and using denial, emotional support, and instrumental support to cope predicted reports of receiving social support by an online gaming friend.

### **05.17.14 Law and Order: The Weight of Testimonial and Physical Evidence in Court**

**Jent,Kelly** *University of Central Oklahoma*

**Hancock,Thomas** *University of Central Oklahoma*

**Fitzgerald,Brandon** *University of Central Oklahoma*

**Gonzalez,Gabriela** *University of Central Oklahoma*

Testimonial and physical evidence are both admitted into court as long as it is probative and does not provide prejudicial information. Eyewitness testimony has a powerful influence in the courtroom. Testimony that corroborates circumstantial evidence nearly quadruples conviction rates regardless of the actual accuracy of the witness. Physical evidence allowed in the court room includes tangible objects such as weapons, blood-spattered objects, photographs, maps, models, and scientific evidence such as DNA. Eyewitness testimony and physical evidence both have influential factors in court; however, there hasn't been much research comparing the impact of the two forms of evidence. This study proposes to evaluate how jurors weight different forms of evidence, testimonial and physical, and whether this ranked importance influences a guilty/not guilty verdict. Participants will read a short narrative and view six pieces of evidence in the order of their perceived importance. This evidence includes three physical and three testimonial pieces. Each piece of evidence has four subcategories – two indicating guilt and two indicating innocence. Guilty/not guilty decisions will be made by sliding a bar on a Likert scale after viewing each piece of evidence, and a final verdict will be made once all evidence has been viewed. The expected outcome is to see different patterns arise in guilty/not guilty verdicts based on the weight placed on different types of evidence.

## **05.17.15 Fear of Alone**

**Lindsey,BreAnn** *University of Central Oklahoma*

The purpose of the criminal justice system is to provide a level of protection for the public through executing proper punishment by way of imposing accountability on an individual for his or her actions. Accurate functioning of this protective body inspires trust in those that seek shelter under the long reaching arm of the law. When the justice system fails, the level of trust and cooperation from the public wanes. One area of failing accuracy is in the interrogation methods used by law enforcement agencies that often result in false confessions. This study seeks to identify possible predisposing factors to false confessions as well as flaws in interrogation tactics. The proposed hypothesis of this study includes the assertion that socially excluded individuals of an anxious attachment are more likely to falsely confess. Social exclusion methods derived from Twenge et al., (2001) and the Computer Crash Paradigm originated by Kassin & Keichel (1996) will be used in conjunction with the minimization tactic for interrogation, to investigate the proposed hypothesis. Results will be used in the refinement of legal procedures and the prevention of false incarceration of innocent individuals.

## **05.17.16 I Pledge Allegiance: The Relationship Between Attention to Terrorism in the Media and Emotion**

**Twyman rack,Hayley** *University of Central Oklahoma*

The aim of the study is to investigate attentional biases to violent media and explore its effect on mood and attitudes. This study aims to further examine the relationship between attention to violent, terrorism-related media and negative mood as well as abidance to the right to civil liberties. Being exposed to graphic images of terrorist attacks can have many negative effects on mood and may affect critical thought (Williams, Foster, & Krohn, 2008). High overall stress is associated with worry about terrorist attacks (Peleg & Mass-Friedman, 2013). For the present study, participants will answer questionnaires regarding mood and agreement with aspects of the Patriot Act, as well as be exposed to violent, prosocial, or neutral audio and visual stimuli presented via an eye-tracker. We hypothesize that those who are exposed to a violent newscast will have greater attentional biases to the violent images. Also, we hypothesize that those with the greatest attentional bias to the violent stimuli will have a greater increase in state anxiety and depression, and agree with more aspects of the Patriot Act.

## **05.17.19 Mirror systems, empathy, and pain recognition using EEG**

**Durham,Justin** *University of Central Oklahoma*

**Mather,Robert** *University of Central Oklahoma*

Pain is subjective, sensory, and emotional experience closely related to the motor system. The ability to recognize when other individuals experience pain and relate to others emotions serves as an adaptive trait for comprehending the cause and effect of events. Mirror systems are clusters of specialized visuomotor neurons that become active both when executing an action and while observing the same action performed by another agent (Rizzolatti et al., 1996). Mirror systems serve as an organic coding system for developing action recognition and understanding motor events. Importantly, these systems are not limited to interacting with physical objects but also involve social aspects of cognition, such as imitation, that requires simulating the minds of others by deciphering facial expressions and gestures. Empathy is the unconscious ability to accurately identify other's emotions or beliefs and adjust responses to facilitate social communication that is necessary for interpreting pain. Support from recent research suggests that further investigation on mirror systems is needed to investigate how observing pain affects understanding and developing empathy. The current project hypothesized that typical participants would have greater mirror system activation while vicariously experiencing pain. EEG electrodes measured the suppression of mu wave oscillations (8-13 Hz) while participants observed a video of painful clips compared to a blank-screen pre and post baseline

## **05.17.20 Risk-Tolerance in Mate Choice**

**Cannon,Amber** *University of Central Oklahoma*

**Jeyaraj-Powell,Tephillah** *University of Central Oklahoma*

Domestic partner abuse is a persistent problem. There is ample research into risk-seeking in several domains, including recreational and social. One domain that seems absent is relational risk-seeking: the willingness to ignore signs of over-commitment by the partner until a relational crisis occurs. The researcher proposes that this mechanism is distinct in men and women. The proposed research will focus on the mechanism in women, and hypothesizes that the tendency to pursue risky mates can be determined via psychometric inventory. Previous research has identified a link between preference for "bad boys" and preference for enlarged pupils in target men. This study proposes modifying existing Domain Specific Risk-Taking scales to identify this mechanism. Women will be recruited to participate in an online survey of the modified scales. They will also be asked to order pupil-modified pictures by perceived attractiveness. A multiple regression will be run on the combined results of the picture order and the new scale to discern the relationship between scores on the scale and preference for larger pupil size.

## **05.17.21 Delete Browsing Histories Regularly: Porn Variety and Aging**

**Scott,Jenn** *University of Central Oklahoma*

**Gayzur,Nora** *University of Central Oklahoma*

**Everson,Adam** *University of Central Oklahoma*

**Limke,Alicia** *University of Central Oklahoma*

Research on sexuality in adulthood has focused on declines in sexual activity (e.g., Avis et al., 2009; Laumann, Glaser, Neves, & Moreira, 2009; Lindau & Gavrilova, 2010; Michael, Gagmon, Laumann, & Kolate, 1994; Welch, 2011) supporting a popular assumption that sexual interests diminish with increasing age. However, this view is limited in scope. This study investigates the link between age and pornography viewing. Thus, 389 participants (18 to 69 years) answered questions anonymously online about their sexual desires, sexual fantasies, sexual scripts, and sexual attitudes. Participants also completed a questionnaire designed for the purpose of this study that assessed pornography viewing (viewing, using to masturbate, intending to imitate with partner, and having already imitated with partner). Results indicate as age increases, difference in the sexual scripts of what individuals think is appropriate in pornography and what individuals think is appropriate in their personal sex lives increases. In addition, as age increases, the variety of pornographic acts watched and used to masturbate increases. Discussion focuses on the implications of defining sexual fantasies and desires as observable behaviors (instead of using only self-reported fantastical thought). Additional discussion focuses on the specific implications of these findings to developmental research regarding age and sexuality.

## **05.17.23 Accessibility of Student Mental Health Services at Oklahoma Colleges and Universities: A Web-Based Study**

**Hughes,Amanda** *Northeastern State University*

The need for mental health services among college and university students is evident. However, no federal or state mandate for provision on-campus mental health services exists. Thus, the objective of the research was to explore mental health services available to students enrolled at institutions of higher education in Oklahoma. Key word searches for "mental health services," "counseling," and "therapy" were used on the websites of each college or university in the Oklahoma. The same key words were used in the same order until the information was found or the search was exhausted. The data shows great variability in accessibility of information as well as in type of services available. Some institutions offer on their websites minimal off-campus referrals, and others publish details about a full range of care free of charge on campus. Recommendations for policy and practice regarding services and for easing student access to such services are presented.

## **05.17.24 Counseling and Recidivism Rates**

**Thurman,Hailey** *Northeastern State University*

Recidivism rates of criminals released from prison in the United States are uncomfortably high. Between 2005-2010 recidivism rates were at 76.6 percent within five years of release (Durose, M.R., Cooper, A., Snyder, H., 2014). Of this 76.6 percent, 56.7 percent of those arrested were within the first year of their release (Durose, et al., 2014). While much research has been done on recidivism rates among released prisoners, not much has been done to lower this rate. It is hypothesized that, if all released prisoners are required to go to mental health counseling on a regular basis for a determined period of time, that recidivism rates will drop significantly throughout the United States. This research will be done through observation and survey of released prisoners, compared by whether they hold a status in a counseling program.

## **05.17.25 The efficacy of Experimental Psychology at the University of Central Oklahoma**

**Scott,Jenn** *University of Central Oklahoma*

**Kesner,Rosa** *University of Central Oklahoma*

**Duran,Dana** *University of Central Oklahoma*

**Vanhoy,Mickie** *University of Central Oklahoma*

The University of Central Oklahoma (UCO) Experimental Psychology program is a research-based masters degree with emphasis on readying students for post-graduate work. We compiled data from previous graduates of the UCO experimental program to include post-graduate program acceptance in comparison to other regional universities. We include the number of graduate students, the amount of funding available to each student, the amount of funding students have received, as well as specifics about the UCO Physiological/Cognitive Laboratory, which is utilized for undergraduate and graduate research.

## **05.17.26 Mad ink: A Multidimensional Evaluation of Tattoos, Personality, Self-Esteem, and Aggression**

**Ray, Cecelia** *Rogers State University*

**Kirk, Mark** *Northeastern State University*

The objective of this study was to investigate any association between having tattoos and personality characteristics, levels of self-esteem and aggression ratings. The researchers hypothesized that tattooed individuals will have higher mean aggression, and self-esteem scores and score significantly higher in the personality trait extroversion. Three scales were used to collect data from the participants as well as a demographics page. The three scales include Rosenberg's Self-Esteem Scale, The Big 5 Inventory, used to test different categories of personality, and the Buss & Perry Aggression Questionnaire. The results revealed that in this sample of 96 individuals those with tattoos ( $n=43$ ) scored significantly higher in Extroversion ( $F=10.07$ ,  $p<.01$ ), Physical aggression ( $F=4.79$ ,  $p<.05$ ), and verbal aggression ( $F=9.05$ ,  $p<.01$ ) than subjects without tattoos ( $n=53$ ). When the sample was split by gender females with tattoos ( $n=31$ ) scored significantly higher on aggression ( $F=6.77$ ,  $p<.05$ ) and extroversion ( $F=8.27$ ,  $p<.01$ ) than females without tattoos ( $n=37$ ). Males with tattoos ( $n=13$ ) scored significantly higher on the personality trait Openness ( $F=4.78$ ,  $p<.05$ ) than males without tattoos ( $n=16$ ). Using Pearson's  $r$  coefficient to examine correlations between number of tattoos and scale scores there were a number of constructs with significant associations. Number of tattoos was significantly, positively correlated with Extroversion Openness and Aggression ( $r=.30$   $p<.$

## **05.17.27 The Context of Heroism**

**Dixon, Haley** *Northeastern State University*

The purpose of the proposed study is to gauge just how contextual an individual's concept of heroism is. This will be explored by a controlled study in which historical figures will be described to individuals in one of two ways: heroic or non-heroic (i.e. villainous). The individual will be tested on their personal opinion (heroic, non-heroic, or indifferent) of these figures, by name, after identifying their alignment within the contextuality of the descriptions previously given during the study. The hope of this study is to highlight how individuals' opinions will fluctuate depending upon how the figures are described.

## **05.17.28 Enclothed Cognition Decomposition Effect on Selective Attention**

**Klevgard,Hunter** *University of Central Oklahoma*

**Scott,Jenn** *University of Central Oklahoma*

**Vanhoy,Mickie** *University of Central Oklahoma*

**Williams,Lindi** *University of Central Oklahoma*

Worn clothing affects selective visual attention response times. Unconscious schema associations, along with physiological state changes, could explain increased sensitivity. Other research has described the effect of clothing on response time in a Stroop visual search task, yet no analysis has been conducted on refined performance structure with an attempt to model non-linear response output times. Stimuli presentation occurred on a computer monitor positioned above a desk while responses on the visual task were recorded via keyboard. The visual task included a blank white background that remained visible while stimuli appeared at the center of the screen. A mask replaced the stimuli and background at the conclusion of each trial. On each trial, a target word was displayed in an incongruent text color. A criterion word was presented in black text simultaneously below the target word. Participants made judgments about whether the meaning of the criterion word was reflected in the color of the target word. In modeling the task, the Holder exponent was mapped against the Fractal dimension to observe the complexity of the task across physiological states. The modeled system displayed almost identical characteristics across conditions, suggesting that change in physiological system did not affect the underlying cognitive systems involved in the selective attention task. The data output was modeled using a continuous wavelet transform to observe embedded systems.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **18. Statistics**

##### **05.18.01 Leisure Time Physical Inactivity (LTPIA), Obesity and Diabetes (DM) Rates in the Southern United States (US)**

**O'Connor, Jennifer** *Northeastern State University*

Background: Nearly 29,000,000 US adults have DM plus 86,000,000 have prediabetes. Physical inactivity is a modifiable risk factor for obesity, prediabetes and DM. People in the Southern US are more likely to be inactive than those in other US regions. Purpose: This study explores changes in and relationships among age-adjusted prevalence rates of LTPIA, obesity, and DM in the Southern US from 1994-2012. Methods: National LTPIA, obesity, and DM data from the Behavioral Risk Factor Surveillance System (BRFSS) were analyzed using SPSS. Datasets included age-adjusted percentages for each state on even numbered years. Results: In 1994, mean national rates of LTPIA, obesity, and DM were 29.5% (CI 27.26, 31.85), 14.1% and 4.5% (CI 3.58, 5.67), respectively. In contrast, mean rates of LTPIA, obesity, and DM in the Southern US were 36.2% (CI 33.9, 38.6), 15.1% and 5% (CI 4.05, 6.16) respectively. Mean obesity rates increased from 15.1% to 30.1%; mean DM prevalence rose from 5% to 10.3% (CI 9.5, 11.6); mean LTPIA rates dropped from 36.2% (CI 33.9, 38.6) to 26.2% (CI 24.8, 27.6) in the Southern US over the 18 years. Nationwide patterns were similar, but less severe. Conclusions: LTPIA, obesity and DM rates in the Southern US are higher than national rates. Although self-reported LTPIA rates have dropped 28% in the Southern US, obesity and DM rates have continued to rise.

##### **05.18.02 Discovering Trends in UCO Student Parking Tickets**

**Murray, Cynthia** *University of Central Oklahoma*

**Cho, Seoungbean** *University of Central Oklahoma*

This study examined UCO student parking tickets for 2014, fall semester (N=8,304). The research questions for these student ticket recipients pertained to the distributions for age, gender, college associated with their major, and number of hours completed. Comparative data based on the UCO student body enrollment for 2014-2015 was also reported. A disproportionate number of tickets, as compared to enrollment demographics, occurred for students age 21-25, male, not affiliated with a specific college, or post-baccalaureate/continuing education. A seasonal exponential smoothing model was fit to the daily number of tickets and criteria for how well the model fit the data was examined. The most ticketed parking lots and the most number of tickets, adjusted for the number of parking spaces available in the lot, were also identified. SPSS, SAS, and EXCEL were used for graphs and statistical tests.



### **05.18.03 How Accident Prone are Oklahomans?**

**Murray,Cynthia** *University of Central Oklahoma*

**Zhou,Qingwen** *University of Central Oklahoma*

This study examined hospital discharges in Oklahoma for accidental injuries. Nationally, unintentional injuries are the 4th leading cause of death (CDC). The Oklahoma State Department of Health provided data for 2010 – 2012 (47,921 discharges). The research questions for these patients pertained to the distributions for age, race, gender, and type of insurance. Estimated survival distributions using hospital length of stay and discharge status were compared for each race. The most common injury types and the causes for those injuries were identified. The most common was for falls resulting in a lower limb fracture. Length of stay (LOS), an indirect indicator of the severity of the injury, was also summarized with regard to gender and race. The average LOS for males was significantly greater than that for females; average LOS for blacks was greater than that for whites. SPSS and SAS were used for graphs and statistical tests.

### **05.18.04 Which Cancer is the Biggest Threat to our Lives: Breast, Colon, or Prostate?**

**Murray,Cynthia** *University of Central Oklahoma*

**Zhou,Qingwen** *University of Central Oklahoma*

Nationally, cancer remains the 2nd leading cause of death, just behind heart disease. This study examined data from the Oklahoma Cancer Registry, 2009-2011, for breast, colon, and prostate cancer cases (N=22,663). The research questions for these cancer patients pertained to the distributions for age at diagnosis, race, and survival. Means for age at diagnosis, proportions within each race, and estimated survival distributions (difference between diagnosis date and date of death) were compared for each type of cancer. All statistical comparison were significant ( $p < 0.05$ ). Breast cancer has the youngest age at diagnosis, the highest proportion of whites with regard to race, and the best estimated survival distribution. SPSS was used for graphs and statistical tests.

### **05.18.05 Statistical Analysis of the Progression of Tumors in Rats**

**Murray,Cynthia** *University of Central Oklahoma*

**Bayles,Esther** *University of Central Oklahoma*

**Chen,Wei** *University of Central Oklahoma*

The research team at the University of Central Oklahoma studied the combination of lasers and immunotherapy on tumor-bearing rats. Their cancer treatment involved three components: laser immunotherapy (LIT), Cyclophosphamide (CY), and Glycated Chitosan (GC). Rats in Group 1 had LIT (10 minutes), GC, and CY; Group 2 had LIT (5 minutes), GC, and CY; and Group 3 received only CY. Data pertaining to the tumors was analyzed using the Kaplan-Meier survival method to determine if there was a difference in “time to failure” distributions with the variation of treatment. Three time intervals (days) were computed: time between tumor inoculation and disappearance of the primary tumor, time between disappearance of the primary tumor and recurrence, and time between inoculation and metastasis. Tumor outcomes were categorized as either a failure or censored observation. Censored observations occurred if there was no failure by either the end of the study or when the rat was euthanized. For each of the three computed time intervals, there was no significant difference ( $p > 0.05$ ) between treatment groups with regard to the estimated survival distributions.

## **05.18.06 A Statistical Analysis of Challenges Faced by First-Time Presidents in Public, Comprehensive Institutions**

**Ford,Lance** *University of Central Oklahoma*

**Dimandja,Christian** *University of Central Oklahoma*

**Bayles,Esther** *University of Central Oklahoma*

**Kinders,Mark** *University of Central Oklahoma*

**Morris,Tracy L.** *University of Central Oklahoma*

There is substantial anecdotal evidence that first-time presidents of public, comprehensive institutions of higher learning face enormous challenges in trying to acclimate to the roles of president. A 38-item survey was conducted of such presidents in an attempt to quantify this acclimation process. Items concerning demographics, type of institution, life experiences, and activities and staff that were helpful in the acclimation process were included. In all, 61 presidents responded to the survey. In this research we focus specifically on the relationships between the type of institution, replacement of senior staff, and other demographic variables. To explore these relationships, three dependent variables were considered and regression models were created to predict these variables based on survey questions. The participants were categorized by institution type (turnaround or realignment), replacement of senior staff (yes or no), and how many senior staff members were replaced. Logistic regression models were developed to predict the dichotomous outcomes of institution type and replacement of senior staff, and a multiple regression model was created to predict the number of senior staff replaced by the institution president. Each model included different independent variables to predict the outcome.

## **05.18.07 Use of Concomitant Antihyperglycemic Medications with the V-Go® Insulin Delivery Device in Patients With Diabetes**

**Sanders,Jessica** *University of Central Oklahoma*

**Webb,Ariel** *University of Central Oklahoma*

**Morris,Tracy L.** *University of Central Oklahoma*

V-Go® is a disposable insulin delivery device used by patients with diabetes requiring the use of insulin. V-Go is a device worn by the patient that delivers a steady dose of insulin for 24 hours and on-demand mealtime dosing as opposed to traditional multiple daily injections of insulin. A previous study (Lajara et al., 2015) of 204 diabetic patients found that there was a significant decrease in HbA1c after patients started using V-Go. The research presented here concerns the use of concomitant antihyperglycemic medications with the V-Go disposable insulin delivery device. The medical records of 56 patients using V-Go were examined. Weight (in kg), HbA1c, and fasting plasma glucose (FPG) were recorded for each patient at baseline and two follow-up visits. Whether or not the patient was taking concomitant antihyperglycemic medications was also recorded at each visit. A two factor repeated measures analysis of covariance was performed for each medication with respect to each outcome variable (weight, HbA1c, and FPG). The two factors were office visit and drug, and the covariate was the baseline measurement of the outcome variable. Only one medication was found to be significantly related to any of the outcome variables. Specifically, the mean HbA1c was significantly lower among patients taking an SGLT2 inhibitor along with V-Go, than among patients not taking an SGLT2 inhibitor ( $p=0.0011$ ).

## **05.18.08 Use of Regular Insulin in the V-GO® Disposable Insulin Delivery Device**

**Webb,Ariel** *University of Central Oklahoma*

**Sanders,Jessica** *University of Central Oklahoma*

**Morris,Tracy L.** *University of Central Oklahoma*

Type 2 diabetes is often controlled using non-insulin glucose lowering medications, but as the disease progresses, insulin is generally used. The V-Go® disposable insulin delivery device delivers intensified insulin therapy and is currently cleared for use with rapid acting insulin. An earlier study (Lajara et al., 2015) found a significant decrease in HbA1c after patients started using V-Go. In a continuation of this study, the use of regular insulin was evaluated in V-Go to determine impact on glycemic control, as costs of rapid insulin are increasing and less expensive alternatives are needed. The medical records of ten patients using V-Go to deliver insulin were retrospectively examined. Four of these patients were transitioned to regular from rapid insulin and six administered regular insulin from the start. Patients were examined at follow-up visits at which time HbA1c, weight, and insulin total daily dose (TDD) were recorded. Hierarchical linear models were developed to estimate A1C, insulin total daily dose (TDD), and weight. In each case, the baseline measurement of the outcome variable, the number of days on V-Go, and a dichotomous variable indicating whether the patient initiated V-Go with RHI or RAI were included as independent variables. Although this is a very small study, the results could help determine if the use of regular insulin in V-Go provides improved glycemic control while decreasing pharmacy costs.

## **05.18.09 Oklahoma is Not “OK”: A Study of Accidental Drug Overdoses**

**Murray,Cynthia** *University of Central Oklahoma*

**Hiddink,Seth** *University of Central Oklahoma*

This study examined hospital discharges in Oklahoma for accidental drug overdoses. In the US, nearly 9 out of 10 poisoning deaths are caused by drugs and 80% of those deaths were accidental. The Oklahoma State Department of Health provided data for 2010 – 2013 (5,358 discharges). The research questions for these patients pertained to the distributions for age, race, gender, type of insurance, and region of the state. The most common drugs were identified. Death and the length of stay (LOS), indicators of the severity of the overdose, were also summarized with regard to the demographic variables. SPSS was used for graphs and statistical tests.

## **05.18.10 Gross Domestic Income Versus Corruption Perception Index in 2008 and 2009**

**Takyi-Micah, Melinda** *University of Central Oklahoma*

**Halderman, Jason** *University of Central Oklahoma*

**Brenneman, Joan** *University of Central Oklahoma*

While corruption is present in all economies, we wanted to determine if there is a relationship between corruption and the economy of a nation. The independent variable chosen was the 2009 Per Capita Income, Adjusted for Inflation in US dollars of the respective countries, which measures the average income per person (GDP). The dependent variable was 2009 Corruption Perception Index (CPI). This index measures the perception of corruption that is perceived to exist in a country. To analyze the data a confidence interval was used to estimate the CPI for all countries; least squares regression was used to determine if there was a linear relationship between the GDP and the CPI; and a matched pairs test was used to determine if and how the CPI changed from 2008 to 2009.

## **05.18.11 Analyzing the sedative effect of low quality research in anesthesiology shows many systematic reviews are still groggy**

**Detweiler, Byron** *Oklahoma State University*

**Kollmorgen, Lauren** *Oklahoma State University*

**Umberham, Blake** *Oklahoma State University*

**Hedin, Riley** *Oklahoma State University*

**Vassar, Matt** *Oklahoma State University*

The validity of primary study results included in systematic reviews plays an important role in drawing conclusions regarding intervention effectiveness and bears implication for clinical decision making. The methodological quality/risk of bias of primary studies should be analyzed and results conveyed in the publication. Although several methods exist for evaluating methodological quality/risk of bias, questions arise concerning the application of these tools in systematic reviews. We evaluated prevalence of methodological quality/risk of bias assessment in anesthesiology systematic reviews, examined commonly applied appraisal instruments, and noted how these were incorporated into results. We selected high-ranking anesthesiology journals based on 2014 Google Scholar Metrics h5-index rankings and searched PUBMED/Medline for reviews published since 2007. Of the initial 315 reviews, 207 were included, and 174 conducted methodological quality/risk of bias analyses. The Jadad scale was most commonly implemented to assess methodological quality/risk of bias. Sub-analysis, meta-regression and sensitivity analyses were rarely reported.

## **05.18.12 Error: Systematic Review Reports Outcome Overload in Pediatric Acute Lymphoblastic Leukemia**

**Wiebe, Jordan** *Oklahoma State University*

**Herrmann, David** *Oklahoma State University*

**Wayant, Christian** *Oklahoma State University*

**Nissen, Timothy** *Oklahoma State University*

**Blaik, Will** *Oklahoma State University*

**Wheeler, Denna** *Oklahoma State University*

**Vassar, Matt** *Oklahoma State University*

Objective: The purpose of this study was to evaluate the common outcomes being reported by researchers in pediatric acute lymphoblastic leukemia in order to compare consistency across studies. Methods: 885 articles were acquired during our literature search from clinical databases. 295 of those articles were randomly sampled for full text review. 113 articles were excluded leaving 182 articles to be included in the analysis. Each coder independently coded ~73 articles. A second coder then determined the validity of each coded element. Discrepancies were resolved by group consensus. Outcome results were sorted and standardized into 9 domains. Results: Post-standardization, it was determined that 41% of outcomes reported were adverse events, 15% were survival, 13% were response, 11% were relapse, 9% were mortality, 4% were remission and cognitive events, and 3% were other outcomes. Conclusion: Outcome reporting in pediatric oncology has a wide variation of focus with a lack of clarity and consistency. Emphasis is placed on survival and adverse effects with little attention placed on quality of life (located in "other" domain). Guidance is needed to improve outcome reporting in a way that is beneficial and relevant to healthcare providers, patients, and researchers.

## **05.18.13 Evaluating the Effect of the Censoring Distribution Assumption for Case I Interval-Censored Survival Data**

**Cook, Tyler** *University of Central Oklahoma*

**Sun, Jianguo** *Other*

One problem researchers often face when analyzing survival data is how to handle the censoring distribution. For practical convenience, it is often assumed that the observation process generating the censoring is independent of the event time of interest. This assumption allows one to effectively ignore the censoring distribution during analysis. Unfortunately, one cannot generally test for independent censoring without additional assumptions or information. Therefore, the researcher is faced with a choice between using methods designed for informative or non-informative censoring. This project investigates the effectiveness of methods developed for case I interval-censored data under both types of censoring. Extensive simulation studies indicate that the methods produce unbiased results in the presence of both informative and non-informative censoring. The efficiency of the informative censoring methods is then compared with approaches created to handle non-informative censoring. The results of these simulation studies can provide guidelines for deciding between models when facing a practical problem where one is unsure about the dependence of the censoring distribution.

## **05.18.14 Publication Bias in Dermatology Systematic Reviews and Meta-analyses**

**Atakpo,Paul** *Oklahoma State University*

Systematic reviews and meta-analyses in dermatology provide high-level evidence for clinicians and policy makers. One methodological flaw with systematic reviews is the underrepresentation of unpublished studies. This problem, known as publication bias, is the product of researchers failing to report findings that are statistically insignificant. Omission of statistically insignificant data from meta-analyses may result in overestimation of treatment effect size. Our goal was to assess whether systematic reviewers in dermatology evaluate and report publication bias. Our study considered systematic reviews and meta-analyses from ten dermatology journals from 2006 to 2016. A PubMed search was generated and all articles that met our inclusion criteria were downloaded and coded. 293 articles were included in our analysis. Additionally, we evaluated publication bias in meta-analyses that failed to do so. Publication bias was formally evaluated in 64 articles (21.8%). Publication bias was present in 45 articles (15.3%), not present in 57 articles (19.5%) and not determined in 191 articles (65.2%). Cumulative meta-analysis by precision method found evidence of publication bias in 15 of 21 meta-analyses (71.4%) that failed to assess publication bias. Many of the reviews in our study did not evaluate publication bias. In comparison to other studies, we found that systematic reviewers in dermatology were less likely to evaluate for publication bias.

## **05.18.15 Graft vs. Host: Rejecting Incompatible Evidence in Pediatric Acute Lymphoblastic Leukemia Studies**

**Nissen,Timothy** *Oklahoma State University*

**Herrmann,David** *Oklahoma State University*

**Wayant,C.** *Oklahoma State University*

**Blaik,Will** *Oklahoma State University*

**Wiebe,Jordan** *Oklahoma State University*

**Wheeler,Denna** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

Condensing numerous trials into meta-analyses is vital to providing meaningful information to clinicians and researchers. Fully-reported outcome elements (what is being measured, how it is being measured, and how these measurements are represented) within studies included in meta-analyses are critical to ensuring meta-analytical quality. Meta-analysis within pediatric oncology has demonstrable struggles to synthesize research: Quality has been rated one on a scale of one to seven. As a meta-analysis is only as good as its component parts, our group expected that incomplete reporting of outcomes accounted for the poor quality in pediatric oncology reviews. Through a three-step process of literature search, standardization and coding of data reported within the literature, and verification of our coding (validation of data standardization by a second reviewer), our research group assembled a data set showing the outcomes being reported in pediatric ALL studies and the completeness of their reporting. Our group found that complete reporting of critical elements was rare, with only 25% of articles thoroughly reporting their outcomes (n=182 studies); that there is a near-universal failure to designate primary outcomes (13% designated, n=182); that completeness of reporting varies between different types of outcomes (ranging from 20% complete to 100%, n=182); and that adverse event reporting in particular has room for improvement (56% of outcome elements reported, n=182).

## 05.18.16 The lack of complete reporting in pediatric anesthesia clinical trials

**Aran, Greg** *Other*

With the abundance of unique outcomes in clinical trials detailing pediatric anesthesiology studies, there lies a difficulty in establishing a set of core outcomes needed for evidence based medicine. Clinical trial registries and the systematic reviews that utilize them are extremely useful in modern day medicine, however their utilization is dependent upon the outcomes, measurements and results they provide. Incomplete reporting of results from pediatric anesthesia trials on web-based registries like Clinicaltrials.gov is extensive, which proves difficult in providing needed information to the public. Multiple systematic reviews such as the ones shown below bring to light the incomplete reporting of published clinical trials and the need for a set of guidelines studies can format from. Our research looked to determine the completeness of reporting among the clinical trials found on a popular online trial registry, Clinicaltrials.gov. We screened all studies that came up under our search of pediatric post operative pain and cross checked our screening results with other team members. After coding each article based upon the clinical trial's study designs and outcomes reported on the registry, we analyzed the completeness of reporting using statistical analysis. Our analysis found that a significant proportion of outcomes reported on clinical trials were not complete in reporting and provided results not shown on the online database.

**05.18.17 A Social Network Analysis of Outcomes in Pediatric Post-Operative Pain Studies Authors: A. Ross; J.Young; A.Demand; G. Aran; R. Hedin; B.K. Carr; M. Vassar, Ph.D. Oklahoma State University – CHS**

**Ross,Andrew** *Oklahoma State University*

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**Demand,Alex** *Oklahoma State University*

**Aran,Greg** *Oklahoma State University*

**Hedin,Riley** *Oklahoma State University*

**Carr,Brandon** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

Objective/Hypothesis: Little is known about the diversity of outcomes measured in clinical trials of post-operative pain in pediatric patients. An increase in the diversity of outcomes presents difficulties when synthesizing data for a systematic review. Therefore, the objective of this study is to explore the nature of outcomes reported in pediatric post-operative pain management clinical trials and to elucidate the outcomes most central to an outcomes network. Method: 165 clinical trials from 1999-2015 were retrieved from clinicaltrials.gov, and the outcomes from each article were extracted. The outcomes were next tabulated on a matrix to determine the co-occurrences between reported outcomes. Social network analysis was performed to identify outcomes most central to the network. Results: There were a total of 577 outcomes, with 148 being unique. Post-operative pain had the most co-occurrences among the trials (n=311), followed by Total Analgesia Post-operatively, Recovery, Time to Rescue Medication, Side Effects, Satisfaction, Length of Hospitalization, Quality of Treatment, Post-Operative Sedation Scores, and Nausea/Vomiting. Conclusion: The development of core outcome sets through a systematic review can reduce the diversity of outcomes measured across studies. Social Network Analysis is a valuable method to see which outcomes are central to trials and can help initiate the development of core outcome sets for pediatric post-operative pain management studies.



## **05.18.18 Is Risk of Bias or Quality Systematically Evaluated in Cardiology Systematic Reviews and Meta-Analyses?**

**Jaiswal,Dev** *Oklahoma State University*

**Vassar,Matt** *Oklahoma State University*

Introduction: Evidenced-based medicine is the basis of treatment guidelines. In cardiology, systematic reviews and meta-analyses are considered level 1a evidence, therefore used to make treatment-defining decisions in the field. It is crucial for these studies to be further evaluated. The goal of the study was to investigate how Measurement Quality or Risk of Bias (MQ/ROB) plays a role in systematic reviews and how potential bias present affects the studies. Methods: Five of the most prominent cardiology journals were selected by impact factor using Google Scholar Metrics. With these journals, 282 articles were selected, screened through Covidence, and the relevant 182 articles were measured for quality. Risk of bias was graded and then further analyzed by their respective journals. Results: In this study, it was found that most authors in Cardiology do not incorporate MQ/ROB in their reviews. Of the 182 articles explored, 99 studies assessed risk of bias. Of the 99 studies, 71 found a risk of bias indicated that 71.72% have some trials with questionable quality. Conclusion: Our study suggests that most authors in Cardiology do not incorporate MQ/ROB in their reviews. When MQ/ROB was assessed, quality is often not fully displayed, leaving ambiguous results. Systematic reviews have pertinent implications of clinical guidelines and decision-making, therefore it is crucial to interpret whether these reviews maintain quality measurements.

## **05.18.19 A simulation study of multiple comparison procedures for differences in proportions**

**Xing,Zhiyuan** *University of Central Oklahoma*

**Morris,Tracy L.** *University of Central Oklahoma*

This study concerns the use of multiple comparison procedures following a significant Chi-square test or Fisher's Exact test. Ten thousand 2x3 matrices of data were simulated from a binomial distribution for various combinations of  $n$  ( $= 20, 50, 100, 200$ ) and  $p$  ( $= 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9$ ). Three different methods were examined: the chi-square test followed by pairwise chi-square tests, Fisher's exact test followed by pairwise Fisher's exact tests, a combination of the chi-square test and Fisher's exact test when more than 20% of the expected counts were less than 5, and the chi-square test followed by Cohen's multiple comparisons (Cohen, 1967). Type I error and power were estimated for each procedure. All simulations were performed in R v.3.2.2.

## **Abstracts from the 2016 Oklahoma Research Day**

### **Held at Northeastern State University**

#### **05. Mathematics and Science**

#### **19. Zoology**

##### **05.19.01 Population Structure and Reproductive Migration of Land Crabs (Brachyura: Gecarcinidae) on a Small Tropical Island**

**Tedford, Kinsey** *University of Central Oklahoma*

**Bass, David** *University of Central Oklahoma*

The white land crab (*Cardisoma guanhumi*) and black land crab (*Gecarcinus ruricola*) are found throughout Grand Cayman, and concern has been expressed from the Cayman Department of Environment regarding their declining populations and current distributions. Possible causes of decline may be due to increases in vehicular traffic, habitat loss, over-exploitation, and isolation from resources. Goals of this study are to collect baseline data to estimate white and black land crab populations and determine their peak breeding seasons. A preliminary study during May 2015 indicated crab activity increased around dusk with rainfall enhancing these movements, and each species appeared to have different habitat requirements. The data collection will take place in summer 2016 on Grand Cayman where these land crab populations exist. Specimens will be captured by hand and biological characteristics will be recorded. Peak spawning periods and seasonal reproductive patterns will be determined by noting females with eggs. In addition, land crab remains (road kills) will be marked on a major highway that passes through the study area to estimate mortality rates caused by vehicles throughout the course of the study. Upon completion of this investigation, the data will be useful in establishing a conservation plan and monitoring land crab populations to ensure they remain sustainable.

##### **05.19.02 Baseline Mammalian Survey of an Old-growth Crosstimbers Forest Preserve in Oklahoma**

**Coppedge, Bryan** *Tulsa Community College*

**Stie, F.** *Tulsa Community College*

We used trail cameras to document the occurrence of medium to large bodied mammals in the Keystone Ancient Forest Preserve (KAFF) near Keystone Lake, Oklahoma from October 2015 to January 2016. We were able to document nine species of mammals in the KAFF during this timeframe: white-tailed deer, coyote, bobcat, fox and gray squirrels, armadillo, opossum, raccoon, and striped skunk.

### **05.19.03 The effects of climate change on the distribution of the red-spotted toad (*Anaxyrus punctatus*)**

**Butler,Chris** *University of Central Oklahoma*

**Curd,Michael** *University of Central Oklahoma*

**cheek,justin** *University of Central Oklahoma*

Rapid climate change as a result of human activities will alter the distribution of most species over a relatively short period. Climatic warming may adversely affect amphibian distributions due to physiological constraints associated with their highly water-permeable skin and ectothermic life history. In the American Southwest, future climate predictions show precipitation and drought becoming more extreme which may pose a significant threat to the existence of amphibians inhabiting xeric rocky habitats such as *Anaxyrus punctatus*. We formulated current and projected (for 2050s and 2070s) climate suitability models for *A. punctatus* using a maximum entropy (Maxent) ecological niche modeling approach. We compared the current and future models for relative concentration pathways 2.6, 4.5, 6.0, and 8.5 to examine how climate change will affect the distribution of *A. punctatus*. Models were ranked based on AICc scores, and the best model included mean temperature of the coldest quarter, annual precipitation, and precipitation seasonality. Future models indicate suitable climate conditions will expand 12–54% and shift north-northwest in response to climate warming under all representative concentration pathways. Due to the limited dispersal ability of this species, full utility of newly suitable areas is unlikely. Furthermore, because of the highly patchy distribution of this species, dispersal between patches may become more or completely disconnected due to unsuitable areas

### **05.19.04 The effects of climate change on the wintering range of the American Tree Sparrow (*Spizella arborea*)**

**Curd,Michael** *University of Central Oklahoma*

**Butler,Chris** *University of Central Oklahoma*

Anthropogenic climate change has shifted the ranges of many species in a relatively short period of time. Many avian species arrive earlier on breeding grounds, begin egg-laying early, exhibit prolonged breeding season, and alter timing and extent of migration in response to recent climate change. Based on Christmas Bird Counts from 1900-2014, the American Tree Sparrow (*Spizella arborea*) is declining in numbers at the southern extent of the wintering range and may be shifting north as a response to changing climate. We created centers of abundance for historic data to determine if the American Tree Sparrow range has shifted in response to climate. We also generated climate suitability models to investigate how the distribution may change under future climate scenarios. Historic data shows that distribution has been shifting north since at least 1950. Highly suitable areas ( $\geq 0.5$ ) were primarily across northern United States and southern Canada. Projected models indicate expansion of highly suitable areas with variability in expansion direction. However, all models show parts of the southern extent of the range becoming decreasingly suitable.

## **05.19.05 Geometrically Compressed Habitat Patches Alter Territory Defense Demands in Male Collared Lizards**

**Braun,Cody** *University of Central Oklahoma*

**Baird,Troy** *University of Central Oklahoma*

Theory predicts that the economics of territory defense should be influenced by variation in the spatial distribution of resources critical for survival and reproduction. In systems where animals are restricted to discrete habitat patches, the size and geometric shape of habitat patches defines their area and perimeter, factors that may influence the relationship between costs and benefits of spatial defense. We tested the influence of habitat geometry and topography on the social tactics of territorial and non-territorial male collared lizards, a species restricted to discrete rock outcroppings, by quantifying lizard behavior in wide and narrow habitat patches defined by markedly different area-to-perimeter ratios. Both male and female densities were much higher on narrow habitat patches. Even though acceptable habitat was compressed, non-territorial males remained within territorial neighborhoods by adopting subordinate social tactics rather than dispersing. Frequencies of male broadcast display and contests with rivals did not differ between the two habitat types. Males defending territories on narrow patches courted more different females, more frequently, and also traveled at higher rates. The compressed geometry of narrow patches appears to promote increased courtship opportunities while allowing males to deter rivals with little increase in costly defensive behaviors.

## **05.19.06 Changes in Social Interactions Between Captive Sumatran Orangutans**

**Jardine,Laura** *Other*

**Hosford,Alanah** *Other*

**Kauffman,Laurie** *Other*

Although Sumatran orangutans (*Pongo abelii*) are critically endangered, there is lack of research on their maturation. Subadult males on the Tanjung Puting reserve have been known to sexually harass females frequently, an act rarely seen in adult males. The Oklahoma City Zoo has two captive orangutans- a 48 year old female, Toba, and a 15 year old subadult male, Elok. Recently Elok has displayed increased sexual behavior, which could potentially lead to adverse effects on Toba's health. The purpose of our research was to determine whether their social interactions have changed over time. We hypothesized that their social interactions increased as Elok matured. We collected data in 15 minute focals using an ethogram to describe the orangutan's behaviors. We specifically examined social play, allogrooming, resting social, and displacement. Using data from 2012 through the present, we found that three of the four studied social interactions increased over time. This research gives us further insight into breeding habits and social needs of orangutans in captivity and the wild, potentially leading to improved conservation efforts.

**05.19.07 An Analysis of the Home Range Size of Scissor-tailed Flycatchers During the Breeding Season: Variation Between Nesting Phases, Habitat Types, and Habitat Variables**

**Stokes, Jared** *Cameron University*

**Roeder, Diane** *University of Oklahoma*

**Husak, Michael** *Cameron University*

Oklahoma's state bird, the Scissor-tailed Flycatcher (*Tyrannus forficatus*), has been extensively studied in areas such as breeding biology and migration patterns. However, no previous studies have looked at the home range size during the breeding season and the variables that could influence size. We calculated home range sizes of nesting Scissor-tailed Flycatchers in native oak/elm (*Quercus/Ulmus*) savannahs and invasive mesquite (*Prosopis glandulosa*) savannahs in southwestern Oklahoma. Color-banded adults were followed during two breeding seasons and their perch locations recorded on a Garmin 62Csx handheld gps unit. Taking advantage of unique weather patterns, we were able to record data for the first season during a record drought and the second season's data were recorded post drought and after record rainfall. Aerial photographs were used to verify accuracy of gps points, and ArcGIS was used to determine home range size using minimum convex polygons. There was considerable variation in home range sizes (1.53 – 18.21 ha), but no significant differences were found between savannah types. Mean home range size (6.02 ha) was larger than has been implied previous literature. Additionally, a multiple linear regression model was used to examine potential effects of 1-ha scale habitat variables on home range size between nesting sites and years.

## Participants in the 2016 Oklahoma Research Day

### Held at Northeastern State University

**Abbott,Deah** *University of Central Oklahoma*

05.17.10

**Abdelmonem,Mohamed** *Northeastern State University*

05.03.103

**ABRAHAM,KJOY** *Langston University*

05.03.112

**Abu-Abed,Alaeddin** *University of Central Oklahoma*

05.08.16

**Acharya,Bipina** *Tulsa Community College*

05.03.51

05.03.52

05.03.53

**Adams,Joanne** *University of Central Oklahoma*

03.01.06

**Adams,Courtney** *Northwestern State University*

05.03.18

**Adebayo,Ayodeji** *University of Central Oklahoma*

05.06.27

**Adegoke,Adelekan** *East Central University*

02.01.06

**Ahlander,Joseph** *Northeastern State University*

05.03.68

05.11.03

05.03.69

**Alabbad,Nasser** *University of Central Oklahoma*

05.08.07

**Al-ag,Charisse** *Other*

02.04.01

**Alasafra,Hussain** *University of Central Oklahoma*

05.13.25

**Albinescu,Dragos** *Northeastern State University*

05.05.16

**ALBUSTANI,MUSTAFA** *University of Oklahoma*

02.03.03

02.03.02

02.03.04

**Alexander,Christine** *University of Central Oklahoma*

01.05.03

**Alger,Opal** *University of Central Oklahoma*

01.03.04

**Alkadhem,Niyaf** *Other*

05.03.55

**Alkhodairi,Salman** *University of Central Oklahoma*

05.08.27

**Alnahwi,Hussain** *University of Central Oklahoma*

05.08.38

**Alomar,Mortahda** *University of Central Oklahoma*

05.08.31

**Alrifai,Rad** *Northeastern State University*

05.06.14

05.06.15

05.06.10

05.06.13

05.06.13

05.06.12

05.06.11

**Alsbou,Dr. Nesreen** *University of Central Oklahoma*

05.08.31

**Altbaumer,Samantha** *University of Central Oklahoma*

05.03.54

**Anderson,Austin** *Northwestern State University*

05.05.40

**Andries,Kenneth** *Other*

05.02.01

**Annalingam,saranja** *University of Central Oklahoma*

05.08.24

**Antonyukov,Sergey** *University of Central Oklahoma*

05.03.06

05.08.03

**Apala,Elizabeth** *East Central University*

05.16.02

**Appeddu,Lisa** *Southwestern Oklahoma State University*

05.15.02

05.15.03

**Aracena,Jimena** *Southwestern Oklahoma State University*

05.03.36

05.03.35

**Aran,Greg** *Oklahoma State University*

05.18.17

05.18.16

**Archer,Connor** *University of Central Oklahoma*

05.06.33

**Argyros,Ioannis** *Cameron University*

05.13.01

**Arthur,Wade** *Oklahoma State University*

05.03.104

**Aryal,Aastha** *Cameron University*

01.04.04

**Atakpo,Paul** *Oklahoma State University*

05.18.14

**Atkins,Dr. LaDonna** *University of Central Oklahoma*

02.02.02

**Atkins,Miko** *Northeastern State University*

05.03.86

**Aukema,Rachel** *University of Central Oklahoma*

05.03.08

**Aula,Mercy** *Northeastern State University*

01.03.09

02.03.27

**Ayres,Brian** *Northeastern State University*

05.14.12

## B

**Bahavar, Cody** *University of Central Oklahoma*

05.08.29

05.08.01

05.08.28

**Bailey, Rachel** *Northwestern State University*

02.04.05

**Baird, Troy** *University of Central Oklahoma*

05.19.05

05.03.80

**Balami, Dilip** *University of Central Oklahoma*

05.08.27

**Balch, Brenden** *University of Central Oklahoma*

05.13.19

05.13.04

**Bang, Eun-Jun** *Northeastern State University*

04.09.04

**Barger Johnson, Jennifer** *University of Central Oklahoma*

01.02.03

**Barlow, Mattie** *University of Central Oklahoma*

03.01.07

03.01.10

03.01.14

**Barnes, Mikasa** *University of Central Oklahoma*

05.08.12

**Barnwell, Jordyn** *Northeastern State University*

05.14.05

**Bartenhagen, Chase** *University of Central Oklahoma*

05.08.29

**Barthell, John** *University of Central Oklahoma*

05.03.81

05.03.76

**Bartley, Kelly** *University of Central Oklahoma*

05.03.08

**Barwari, Ronak** *Other*

05.03.03

**Baskin, Meagan** *University of Central Oklahoma*

01.06.03

01.06.02

**Bass, David** *University of Central Oklahoma*

05.19.01

05.03.21

**Bastible, Stephen** *Southeastern Oklahoma State University*

05.03.14

**Bayles, Esther** *University of Central Oklahoma*

05.18.06

05.18.05

05.13.08

**Beadle, Corey** *University of Central Oklahoma*

05.08.18

**Beakley, Logan** *East Central University*

02.01.06

**Beck, Rhonda** *University of Central Oklahoma*

04.07.03



**Beckham, Jacob** *Tulsa Community College*  
05.03.51

**Behar, Amanda** *Oklahoma State University*  
05.03.117  
05.03.33  
05.03.34

**Behdad, Layli** *Northeastern State University*  
05.05.30

**Bell, Kathy** *Other*  
04.09.02

**Benson, Susan** *University of Central Oklahoma*  
02.01.04  
02.01.07

**Benton, Matthew** *University of Central Oklahoma*  
05.08.26  
05.08.19

**Berent, Robyn** *University of Oklahoma*  
05.03.13

**Bertram, Dr. Glee** *University of Central Oklahoma*  
02.02.02

**Bhargava, Kanika** *University of Central Oklahoma*  
05.03.74  
02.03.08  
02.03.12  
02.03.07  
01.03.04

**Bhusal, Raju** *Cameron University*  
01.04.06

**Bidichandani, Sanjay** *Other*  
05.03.97

**Bidlack, James** *University of Central Oklahoma*  
05.03.06  
05.03.08  
05.03.07

**Biggs, Dylan** *Southwestern Oklahoma State University*  
02.03.24

**Biles, Charlie** *East Central University*  
05.03.110  
05.03.105  
05.03.109

**Billings, Cecilia** *Northeastern State University*  
05.14.03

**Binnings, Corrine** *Cameron University*  
04.01.03  
04.01.02

**Bisht, Rahul** *Cameron University*  
01.04.05

**Blaik, Will** *Oklahoma State University*  
02.03.20  
05.18.12  
05.18.15

**Blanco, Daniel** *Northeastern State University*  
02.03.26

**Blanton, Corrin** *University of Central Oklahoma*  
05.13.16

**Bleichner,Jeffrey** *Tulsa Community College*  
05.03.52  
**Bliss,Kristen** *University of Central Oklahoma*  
05.03.130  
**Boatright,Ciara** *Tulsa Community College*  
05.03.53  
**Bogie,Amanda** *University of Oklahoma*  
05.03.13  
**Boland,Matthew** *University of Central Oklahoma*  
05.08.18  
**Bonea,Ashley** *Northeastern State University*  
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**Bourne,Hannah** *Southeastern Oklahoma State University*  
05.11.01  
**Bourobou,Wendrill** *Southeastern Oklahoma State University*  
01.04.12  
**Bowen,John** *University of Central Oklahoma*  
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**Boyd,Larissa** *University of Central Oklahoma*  
02.03.06  
**Braggs,Aundria** *University of Central Oklahoma*  
03.01.15  
**Brandao,Mariano** *University of Central Oklahoma*  
05.03.99  
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**Brassard,Marie** *Langston University*  
05.02.05  
05.02.04  
**Braun,Cody** *University of Central Oklahoma*  
05.19.05  
**Brennan,Robert** *University of Central Oklahoma*  
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**Brenneman,Joan** *University of Central Oklahoma*  
05.18.10  
**Brewer,Allison** *Northeastern State University*  
05.14.02  
**Bried,Jason** *Other*  
05.03.31  
05.04.02  
**brown,guy** *University of Central Oklahoma*  
02.01.14  
**Brown,Bethany** *Other*  
05.13.14  
**Brown,Chundira** *East Central University*  
05.05.36

**Brown,Dan** *Southwestern Oklahoma State University*  
04.08.06  
**Brumley,Daniel** *University of Central Oklahoma*  
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05.13.05  
**Bryan,Brendan** *University of Central Oklahoma*  
05.06.20  
**Bryson,Matthew** *University of Central Oklahoma*  
05.03.55  
**Burgess,Gwen** *Southwestern Oklahoma State University*  
05.15.02  
05.15.03  
**Burgess,Melinda** *Southwestern Oklahoma State University*  
05.15.02  
05.15.03  
**Burke,Bradly** *Southwestern Oklahoma State University*  
05.03.118  
**Burl,Gavin** *East Central University*  
04.08.14  
**Burr,Brandon** *University of Central Oklahoma*  
02.02.03  
02.02.02  
**Butcher,Talitha** *East Central University*  
02.01.06  
**Butler,Chris** *University of Central Oklahoma*  
05.03.132  
05.03.24  
05.19.03  
05.19.04  
**Byrd,Jennifer** *University of Central Oklahoma*  
01.07.04

## C

**Cakmak,Ibrahim** *University of Central Oklahoma*  
05.03.81  
**Caldwell,Christopher Caldwell** *East Central University*  
04.08.08  
**Calhoun,Michael** *Other*  
02.04.01  
**Camp,James** *University of Central Oklahoma*  
05.08.21  
**Campos Cardoso,Matheus** *University of Central Oklahoma*  
05.06.05  
**Cannon,Amber** *University of Central Oklahoma*  
05.17.20  
**Cansler,Megan** *Northwestern State University*  
05.15.01  
**Carr,Brandon** *Oklahoma State University*  
05.18.17  
02.03.23  
02.03.11  
**Carter,Claressa** *Northwestern State University*  
05.15.01  
**Caughron,Katie** *Cameron University*  
02.01.05

**Cedillo,Alexis** *University of Central Oklahoma*  
01.07.04  
**Chakroun,Amer** *University of Central Oklahoma*  
05.08.07  
**Chapman,Tye** *University of Central Oklahoma*  
05.05.02  
**Chaudhary,Jayant** *Cameron University*  
01.04.11  
**cheek,justin** *University of Central Oklahoma*  
05.03.50  
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05.19.03  
**Chen,Wei** *University of Central Oklahoma*  
05.05.10  
05.08.25  
05.08.01  
05.03.87  
05.18.05  
05.08.28  
**Cheng,Dr. Joselina** *University of Central Oklahoma*  
01.05.01  
**Cho,Seoungbean** *University of Central Oklahoma*  
05.18.02  
**Choi,SeonMi** *University of Central Oklahoma*  
03.03.15  
**Chooback,Lilian** *University of Central Oklahoma*  
05.05.24  
05.05.26  
**Chopra,Nagesh** *University of Central Oklahoma*  
04.05.01  
**Christy,Jacob** *University of Central Oklahoma*  
05.08.32  
**Chutake,Yogesh** *University of Oklahoma*  
05.03.97  
**Cisar,Cindy** *Northeastern State University*  
05.11.02  
**Clark,Mark** *East Central University*  
05.05.27  
**Clark,Jamie** *University of Central Oklahoma*  
05.12.02  
**Clark,Kara** *University of Central Oklahoma*  
05.08.05  
05.08.23  
**Clay,Hillary** *Northeastern State University*  
05.14.08  
**Clear,Sherri** *University of Central Oklahoma*  
02.02.02  
**Click,Carolyn** *University of Central Oklahoma*  
03.01.12  
03.01.11  
**Clinton,M. Suzanne** *University of Central Oklahoma*  
01.03.08  
01.06.03  
01.06.02  
01.06.05  
01.06.04

**Clymer, Maranda** *East Central University*  
05.13.11

**Coffman, Cristina** *University of Central Oklahoma*  
05.11.06

**Cphoon, Andrew** *University of Oklahoma*  
05.17.08

**Colby, Devon** *Other*  
05.05.05

**Cole, Kenenth** *Northeastern State University*  
02.03.18

**Collins, Leslie** *Other*  
02.04.01  
05.03.23  
05.03.09  
05.15.01  
02.04.05  
02.04.04  
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05.03.17  
05.12.03  
02.04.02  
05.03.27

**Condry, Kimberly** *East Central University*  
05.03.110

**Conyac, Ryan** *University of Central Oklahoma*  
05.06.23

**Cook, Tyler** *University of Central Oklahoma*  
05.18.13

**Cook, Justin** *Cameron University*  
03.04.02

**Cook, Sarah** *Northeastern State University*  
05.14.10

**Copeland, Kristopher** *Northeastern State University*  
04.01.01

**Coppedge, Bryan** *Tulsa Community College*  
05.19.02

**Corbit, Brian** *Tulsa Community College*  
05.03.82

**Corley, Jodi** *Northeastern State University*  
05.02.10

**Cothran, Rickey** *Southwestern Oklahoma State University*  
05.03.125  
05.03.126  
05.03.124  
05.03.113

**Cowan, J.** *Sunshine University of Central Oklahoma*  
02.03.09

**Cox, Alichia** *Northeastern State University*  
05.14.09

**Cox, Jordan** *Tulsa Community College*  
05.03.52  
05.03.53

**Coy, Devan** *University of Central Oklahoma*  
05.03.111

**Coyer,James** *Other*

05.10.07

**Craig,Cole** *University of Central Oklahoma*

05.03.74

05.05.15

**Crandell,Katelyn** *University of Central Oklahoma*

05.10.01

**Crawford,Wil** *East Central University*

04.08.18

**Crist,Jeremy** *University of Central Oklahoma*

05.08.32

**Crittell,Charles** *East Central University*

05.05.27

05.05.28

**Crofford,Geary** *Northeastern State University*

02.01.16

**Cullum,Kaylin** *East Central University*

04.08.05

**Culpepper,Megan** *University of Central Oklahoma*

04.07.01

**Cumbie,Julie** *University of Central Oklahoma*

01.04.01

**Cunliff,Ed** *University of Central Oklahoma*

02.01.10

02.01.09

02.01.03

**Curd,Michael** *University of Central Oklahoma*

05.19.03

05.19.04

**Curry,Brandon** *Tulsa Community College*

05.03.51

05.03.52

05.03.53

**Curtis,Kath** *Oklahoma State University*

05.03.85

**Curtiss,Joshua** *Northeastern State University*

05.03.10

## D

**Dahl,Elizabeth** *University of Central Oklahoma*

04.07.08

**Darbandi,Samira** *Tulsa Community College*

05.03.51

**Das-Bradoo,Sapna** *Northeastern State University*

05.03.103

05.03.65

05.03.89

05.03.93

**Davis,Ryan** *University of Central Oklahoma*

05.08.06

**Dawkins,Bryan** *University of Central Oklahoma*

05.13.23

**Dawson,Lionel** *Oklahoma State University*

05.02.07

05.02.08

**Daye, Yvonne** *University of Central Oklahoma*  
03.05.02  
**Dayhoff, Kaytlen** *Cameron University*  
03.04.10  
**de Banzie, John** *Northeastern State University*  
05.11.02  
**DeFilippo, Bailey** *Southwestern Oklahoma State University*  
04.08.03  
**DeLeon, Steven** *Tulsa Community College*  
05.03.52  
**Demand, Alex** *Oklahoma State University*  
05.18.17  
02.03.25  
**DeMoss, Emily** *Northeastern State University*  
05.05.38  
**Demuth, Mara** *Northeastern State University*  
05.05.11  
**DeNeen, Whitney** *Northeastern State University*  
05.03.19  
**Deng, Sisi** *East Central University*  
01.02.04  
**Deole, Ratnakar** *Northeastern State University*  
05.03.83  
05.05.30  
**DePre, Audery** *East Central University*  
04.08.07  
**DeRosier, Wes** *Northeastern State University*  
05.14.12  
**DeShazer, Jordan** *University of Central Oklahoma*  
05.03.08  
**Detten, Grant** *Oklahoma State University*  
02.03.23  
02.03.13  
05.03.84  
**Detweiler, Byron** *Other*  
02.03.15  
02.03.13  
05.18.11  
05.03.84  
02.03.14  
02.03.23  
**Dhoonmoon, Ashna** *Southwestern Oklahoma State University*  
05.03.125  
05.03.113  
**Dill, Jeanie** *University of Central Oklahoma*  
03.01.13  
**Dimandja, Christian** *University of Central Oklahoma*  
05.18.06  
**Dinh, Phuong** *University of Central Oklahoma*  
05.05.14  
**Dinkel, Austin** *Northeastern State University*  
05.05.12  
**Dixon, Haley** *Northeastern State University*  
05.17.27

**Dorety,Adam** *University of Central Oklahoma*  
05.08.35  
05.08.22  
**Doughty,Austin** *University of Central Oklahoma*  
05.08.25  
05.08.01  
**Dr. Duarte,Patricia** *Oklahoma State University*  
02.03.12  
**Drescher,Laurelyn** *University of Central Oklahoma*  
05.03.07  
**Dressler,Garrett** *University of Central Oklahoma*  
05.05.04  
05.05.33  
**Driver,Callie** *University of Central Oklahoma*  
05.06.20  
**Dugger,Karissa** *University of Central Oklahoma*  
02.03.10  
**Duncan,Joshua** *East Central University*  
05.03.110  
**Dunn,Tia** *Northeastern State University*  
05.05.25  
**Dunn,Evan** *Northeastern State University*  
05.14.11  
**Duran,Dana** *University of Central Oklahoma*  
05.17.25  
**Durham,justin** *University of Central Oklahoma*  
05.17.19  
**Dykes,Michael** *Cameron University*  
01.04.08  
01.04.10  
**Dykes,Brad** *University of Central Oklahoma*  
02.01.10  
02.01.09  
01.07.06

## E

**Earl,Mazie** *Southwestern Oklahoma State University*  
05.03.118  
**Eccleston,Brian** *Tulsa Community College*  
05.03.51  
05.03.53  
**Eddington,Casey** *Northeastern State University*  
05.03.103  
**Eden Long,Katelyn** *University of Central Oklahoma*  
04.02.03  
**Eleshy,Rawan** *Oklahoma State University*  
05.03.37  
05.03.104  
**Ellis,Tanara** *University of Central Oklahoma*  
05.05.14  
**Embry,Kati** *University of Central Oklahoma*  
01.03.08  
**English,Melissa** *University of Central Oklahoma*  
03.05.03



**Eno,Susan** *Southwestern Oklahoma State University*

[05.03.96](#)

**Esqueda,Carmen** *University of Central Oklahoma*

[05.03.44](#)

**Estes,Robert** *University of Central Oklahoma*

[05.08.31](#)

**Evans,Myron** *Other*

[05.02.01](#)

**Evans,Russell** *University of Central Oklahoma*

[05.05.26](#)

**Everson,Adam** *University of Central Oklahoma*

[05.17.13](#)

[05.17.21](#)

## F

**Farrar,Justin** *Northeastern State University*

[05.11.03](#)

**Faw,Joshua** *University of Central Oklahoma*

[05.03.07](#)

**Felicio de Araujo,Danilo** *University of Central Oklahoma*

[05.06.05](#)

**Fenwick,Allyson** *University of Central Oklahoma*

[05.03.63](#)

[05.03.64](#)

**Ferron,Travis** *University of Central Oklahoma*

[05.08.13](#)

**Fessler,Jennifer** *University of Central Oklahoma*

[05.03.77](#)

**Fields,Joseph-Michael** *Langston University*

[05.03.107](#)

**Fijalka,Daniel** *University of Central Oklahoma*

[05.08.05](#)

[05.08.23](#)

**Fischer,Hayley** *Northeastern State University*

[05.03.123](#)

[05.03.91](#)

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[05.03.86](#)

**Fischer,Justin** *University of Central Oklahoma*

[05.08.03](#)

**Fisher,Lana** *Northeastern State University*

[05.14.04](#)

**Fisher,Andrew** *Northeastern State University*

[05.03.90](#)

[05.03.91](#)

[05.03.131](#)

[05.03.86](#)

**Fisher,Derek** *Other*

[05.03.34](#)

**Fitts,Don** *Other*

[05.08.32](#)

**Fitzgerald,Brandon** *University of Central Oklahoma*

[05.17.14](#)

**Fleming,Christian** *University of Central Oklahoma*  
05.05.24  
05.05.26  
**Fleming,Parker** *University of Oklahoma*  
05.03.129  
**Fleming,Jordan** *Oklahoma State University*  
05.03.121  
05.03.122  
**Fletcher,Jared** *Northeastern State University*  
05.03.89  
**Flippin,Emily** *Tulsa Community College*  
05.03.51  
**fly,kelsey** *Northwestern State University*  
02.04.02  
**Ford,Lance** *University of Central Oklahoma*  
05.18.06  
**Ford,Julia** *Northwestern State University*  
02.04.05  
**Ford,Darrell** *University of Central Oklahoma*  
01.02.02  
**Foreman,Andrew** *Northeastern State University*  
05.06.11  
**Fors-Francis,Kisa** *Tulsa Community College*  
05.03.82  
**Foster,Nicholas** *Oklahoma State University*  
05.08.30  
**Foutch,Shae** *Northeastern State University*  
02.03.27  
**Francis,William** *Tulsa Community College*  
05.03.82  
**Francisco,Megan** *Langston University*  
05.03.114  
05.03.115  
**Freels,Tara** *Southwestern Oklahoma State University*  
02.03.28  
**Fritch,Dr John** *University of Central Oklahoma*  
02.06.02  
**Frizzell,Andrea** *Southeastern Oklahoma State University*  
05.03.12  
**Fu,Jicheng** *University of Central Oklahoma*  
05.06.22  
05.06.03  
05.06.25  
05.06.02  
05.06.24  
05.06.29  
**Fulkerson,Michael** *University of Central Oklahoma*  
05.13.25  
05.13.19  
05.13.20  
05.13.17  
**Fultz,Brandy** *Northeastern State University*  
05.03.103  
05.03.65  
05.03.89  
05.03.93

## G

**Gabbard, Lanie** *University of Central Oklahoma*  
03.03.14

**Gainer, Sonnie** *University of Central Oklahoma*  
05.03.128

**Galbraith, Katie** *Northeastern State University*  
05.14.08

**Galewaler, Jeffrey** *Southeastern Oklahoma State University*  
01.04.13

**Gamagedara, Dr. Sanjeewa** *University of Central Oklahoma*  
05.08.24  
02.03.07  
05.05.29  
05.05.15  
05.05.14  
05.05.06

**Garcia, Alfredo** *Northeastern State University*  
05.03.116

**Gattani, Mansi** *Oklahoma School of Science and Mathematics*  
05.05.21

**Gayzur, Nora** *University of Central Oklahoma*  
05.17.21

**Genchev, Stefan** *University of Central Oklahoma*  
01.02.05

**George, Reeder** *Northeastern State University*  
05.03.88  
05.03.86

**Gerlitz, Immanuel-Carl** *Southeastern Oklahoma State University*  
01.04.09

**Ghafil, Jalal** *University of Central Oklahoma*  
02.03.17

**Ghimire, Summit** *University of Central Oklahoma*  
05.06.32

**Ghosh, Sanchari** *Northeastern State University*  
01.03.09

**Gibson, Keylie** *University of Central Oklahoma*  
05.10.06

**Gill, Blake** *Other*  
05.03.66

**Gilliam, Nathan** *University of Central Oklahoma*  
05.08.06

**Gillispie, Aric** *University of Central Oklahoma*  
05.08.35

**Gilmore, Danielle** *University of Central Oklahoma*  
02.03.09

**Gipson, Terry** *Langston University*  
05.02.07  
05.02.03  
05.02.06  
05.02.02  
05.02.04  
05.02.08  
05.02.01

**Glenn,Weston** *Cameron University*  
01.04.07  
01.04.11  
**Godfrey,Micah** *East Central University*  
05.13.12  
**Goerke,Kale** *Oklahoma State University*  
05.03.120  
**Goetsch,Arthur** *Langston University*  
05.02.05  
05.02.07  
05.02.03  
05.02.06  
05.02.02  
05.02.04  
05.02.08  
05.02.01  
**Golden,Teresa** *Southeastern Oklahoma State University*  
05.03.02  
05.03.12  
05.03.79  
05.03.16  
05.03.14  
05.11.01  
**Gomes Dos Santos,Danianny** *University of Central Oklahoma*  
05.06.05  
**Gonzalez,Victor** *University of Central Oklahoma*  
05.03.81  
05.03.76  
**Gonzalez,Gabriela** *University of Central Oklahoma*  
05.17.14  
**Grafton,William** *Northeastern State University*  
05.06.12  
**Gravchikov,Stan** *University of Central Oklahoma*  
05.06.26  
**Graves,David** *University of Central Oklahoma*  
05.03.06  
**Green,Jana** *Northeastern State University*  
05.04.02  
**Greene,Nautica** *University of Central Oklahoma*  
01.06.05  
01.06.04  
**Greene,Jessica** *Northeastern State University*  
05.14.10  
**Gregory,Allyson** *East Central University*  
04.02.04  
**Grinnell,Addy** *Other*  
05.03.67  
**Grounds,Chad** *University of Central Oklahoma*  
05.13.16  
**Grove,Roxanna** *University of Central Oklahoma*  
05.03.22  
**Grubb,Tyler** *University of Central Oklahoma*  
05.08.03  
**Grzybowski,Jospeh** *University of Central Oklahoma*  
05.03.134

**Guerrero Criado, Andres** *Oklahoma State University*

05.04.03

**Guffey, Jordan** *University of Central Oklahoma*

05.03.99

05.03.102

**Gulick, Jessica** *Northwestern State University*

05.03.25

**Gunning, Courtney** *Southwestern Oklahoma State University*

05.03.36

**Gutierrez, Ivan** *University of Central Oklahoma*

05.06.19

**Gutierrez, Ivan** *University of Central Oklahoma*

05.06.30

## H

**Haftman, Laura** *Northwestern State University*

05.03.17

**Halderman, Jason** *University of Central Oklahoma*

05.18.10

**Hall, Preston** *University of Central Oklahoma*

05.03.49

**Hammond, William** *University of Central Oklahoma*

05.03.50

05.03.48

05.03.21

**Hancock, Thomas** *University of Central Oklahoma*

05.17.14

05.17.06

**Hancock, Ken** *Northeastern State University*

02.01.18

02.01.17

**Hansen, Kennedy** *University of Central Oklahoma*

01.03.05

**Harmon, Chelsea** *Northwestern State University*

05.03.28

05.03.29

05.03.27

**Harrie, Marc** *Northeastern State University*

05.14.05

**Harrigan, Trevor** *Cameron University*

03.04.01

**Harrington, Patrick** *Northeastern State University*

05.06.01

**Harris, Maxton** *University of Central Oklahoma*

04.05.03

**Harris, Kristie** *Northeastern State University*

05.03.119

05.03.86

**Hart, Steve** *Langston University*

05.02.07

05.02.08

**Harvey, Kody** *University of Central Oklahoma*

05.03.101

**Harvey, Aaron** *University of Central Oklahoma*

05.08.37

**Harvey,Phillip** *University of Central Oklahoma*  
04.07.12

**Hasanjee,Aamr** *University of Central Oklahoma*  
05.08.25  
05.08.01  
05.03.87

**Hassan,Zayed** *University of Central Oklahoma*  
05.05.29

**Hatherley,Sherry** *University of Central Oklahoma*  
04.07.04

**Hawkins,Joshua** *Northwestern State University*  
02.01.11

**Haws,James** *University of Central Oklahoma*  
05.17.03  
05.17.04  
05.17.01  
05.17.02

**Haws,Kyle** *University of Central Oklahoma*  
05.17.11  
05.17.09

**Hayes,Jerry** *Langston University*  
05.02.06

**Haynie,Michelle** *University of Central Oklahoma*  
05.11.06

**Heavener,Trace** *Oklahoma State University*  
02.03.01

**Hedin,Riley** *Oklahoma State University*  
05.18.17  
05.18.11

**Hegstrom,Kristina** *University of Central Oklahoma*  
05.10.05

**Hendricks,Carolyn** *University of Central Oklahoma*  
05.03.102

**Hendricks,Lindsey** *Southwestern Oklahoma State University*  
05.03.126  
05.03.113

**Henricks,Colton** *Southwestern Oklahoma State University*  
02.03.24

**Henry,Chisum** *East Central University*  
04.08.25

**Henson,Anna** *University of Central Oklahoma*  
01.07.05

**Hernandez,Zorba** *Oklahoma State University*  
02.03.12

**Hernandez Sarabia,Jesus** *Oklahoma State University*  
02.03.05

**Herrmann,David** *Other*  
02.03.15  
02.03.20  
05.18.12  
05.18.15

**Hewitt,Olivia** *University of Central Oklahoma*  
04.07.05

**Hiddink,Seth** *University of Central Oklahoma*  
05.18.09

**Higuchi,Elsa** *University of Central Oklahoma*  
03.01.05  
**Hilal,Mona** *University of Central Oklahoma*  
05.03.60  
05.08.41  
**Hilbert,Dana** *Cameron University*  
02.01.05  
**Hill,Caleb** *Northeastern State University*  
05.03.108  
**Hill,Ben** *Southwestern Oklahoma State University*  
02.03.24  
**Hillis,Nathan** *University of Central Oklahoma*  
05.08.20  
05.03.132  
05.11.05  
05.06.13  
05.05.35  
05.05.31  
**Hmeluk,Natalie** *Tulsa Community College*  
05.03.05  
**Ho,Trung** *University of Central Oklahoma*  
04.08.10  
**Hodges,Kyle** *University of Central Oklahoma*  
05.08.21  
**Hoenes,Richard** *Northeastern State University*  
02.01.13  
**Hoffmeister,Jordan** *University of Oklahoma*  
05.17.08  
**Holbert,Baylee** *Southeastern Oklahoma State University*  
05.11.01  
**Holguin,Cesar** *University of Central Oklahoma*  
05.08.32  
**Holmes Ph. D., R.D., L.D.,Tawni** *University of Central Oklahoma*  
02.02.02  
02.03.17  
**Holzman,Matthew** *Other*  
02.03.21  
02.03.11  
**Hopkins,Ashley** *Northeastern State University*  
05.10.02  
**Hopkins,Ruth** *University of Oklahoma*  
05.11.05  
**Hopkins,Britney** *University of Central Oklahoma*  
05.13.06  
05.13.05  
05.13.08  
**Horton,Amanda** *University of Central Oklahoma*  
03.03.01  
**Hosford,Alanah** *Other*  
05.19.06

**Hossan,Mohammad** *University of Central Oklahoma*

05.08.24

05.08.26

05.08.36

05.08.42

05.08.19

05.08.43

05.08.13

**Howard,Benjamin** *Oklahoma State University*

02.03.23

05.03.84

**Howard,Gregory** *Northeastern State University*

05.06.14

**Howard,Kristen** *Southwestern Oklahoma State University*

05.03.96

**Howard,Tiffany** *Northwestern State University*

05.03.18

**Hranitz,John** *University of Central Oklahoma*

05.03.81

05.03.76

**Hsu,Kuang-Chung Hsu** *University of Central Oklahoma*

01.03.03

**Huffman,Jessica** *Southwestern Oklahoma State University*

05.03.35

**Hughes,Charles** *University of Central Oklahoma*

05.08.38

**Hughes,Amanda** *Northeastern State University*

05.17.23

**Humphries,Michael** *University of Central Oklahoma*

02.01.07

**Hunt,Andra** *Cameron University*

02.05.02

**Hunter,Taylor** *East Central University*

04.08.19

04.08.05

**Hurst,Amy** *Other*

05.03.66

05.03.67

**Husak,Michael** *Cameron University*

05.19.07

**Hutchens,Terry** *Other*

05.02.01

**Huyen,Phuong** *University of Central Oklahoma*

05.08.03

**HyoImo,Pasang** *Cameron University*

05.05.19

## I

**Idris,Rukayat** *Southwestern Oklahoma State University*

05.03.62

**Ilondior,Emmanuel** *Cameron University*

05.05.37

**im,sun il** *Northeastern State University*

05.03.65

05.03.11



**Iqbal,Hazel** *Other*

02.01.16

**Ita,Maureen** *University of Central Oklahoma*

02.03.07

## J

**Jackson,Karisha** *Cameron University*

03.04.05

**Jackson,Imani** *Langston University*

05.03.112

**Jacob,Jamey** *Oklahoma State University*

05.08.30

**Jahan,Rehana** *University of Central Oklahoma*

05.06.32

**Jaiswal,Dev** *Oklahoma State University*

05.18.18

**James,Kendrea** *Northeastern State University*

04.01.01

**Jardine,Laura** *Other*

05.19.06

**Jarshaw,Jane** *University of Central Oklahoma*

05.03.01

05.03.07

**Jassemnejad,Baha** *Other*

05.08.06

05.08.32

**Jensen,Dr. Crystal** *Southeastern Oklahoma State University*

02.01.15

**Jent,Kelly** *University of Central Oklahoma*

05.17.14

**Jeong,E.K.** *Southwestern Oklahoma State University*

04.09.01

**Jeyaraj-Powell,Tephillah** *University of Central Oklahoma*

05.17.02

05.17.20

**Jiang,Yuhao** *University of Central Oklahoma*

05.08.11

**Jin,Quanxiu** *University of Central Oklahoma*

05.05.34

**Jog,Suneeti** *Northeastern State University*

05.03.31

05.04.02

**Jog,Chintamani** *University of Central Oklahoma*

01.03.04

**johari,abbas** *Cameron University*

03.04.14

03.04.13

**Johnson,Jordan** *University of Central Oklahoma*

05.08.14

**Johnson,Haley** *University of Central Oklahoma*

03.01.01

**Johnson,Jason** *Southwestern Oklahoma State University*

05.05.08

**Johnson,Stephanie** *Southeastern Oklahoma State University*

01.04.03

**Johnson,William** *Cameron University*  
03.04.11  
**Johnson,Laura** *University of Central Oklahoma*  
02.01.12  
**Johnson,Amy** *University of Central Oklahoma*  
03.03.13  
**Johnson,Cayla** *Other*  
05.03.34  
**Joines,Allison** *Southeastern Oklahoma State University*  
05.03.16  
**Jones,Alexis** *Northeastern State University*  
05.03.19  
**Jones,Megan** *University of Central Oklahoma*  
02.01.07  
02.01.12  
**Jones,Jacob** *University of Central Oklahoma*  
03.01.19  
**Jones,Ralph** *University of Central Oklahoma*  
05.03.78  
**Joshi,Ayush** *Cameron University*  
01.04.08  
01.04.10  
05.13.13  
**Jourdan,Thomas** *University of Central Oklahoma*  
05.10.07

## K

**Kadel,Gokul** *Cameron University*  
05.13.13  
**Kalantari,Farzan** *University of Central Oklahoma*  
05.13.24  
**Kambour,Tina** *University of Central Oklahoma*  
02.02.02  
**Karber,Kristi** *University of Central Oklahoma*  
05.13.06  
05.13.05  
05.13.08  
**KARKI,NISHAN** *Cameron University*  
05.13.26  
**Karpowicz,Steven** *University of Central Oklahoma*  
05.08.05  
05.08.23  
05.08.42  
05.08.43  
05.03.61  
05.03.57  
05.03.22  
**Karsoum,Anas** *University of Central Oklahoma*  
05.08.31  
**Karsten,William** *Other*  
05.05.24  
**Kauffman,Laurie** *Other*  
05.19.06  
**KC,Ashmita** *East Central University*  
05.03.109

**Kelley,Heather** *Southwestern Oklahoma State University*

05.15.03

**Kembaity,Mohammed** *University of Central Oklahoma*

05.08.31

**Kengwoung-Keumo,Jean-Jacques** *Cameron University*

05.13.07

05.13.02

**Kennedy,Ericka** *University of Central Oklahoma*

02.02.02

**Kesner,Rosa** *University of Central Oklahoma*

05.17.25

**Kessler,Emily** *Southwestern Oklahoma State University*

05.03.118

**Key,kelsie** *Northeastern State University*

05.03.108

**Khadka,Pritika** *University of Central Oklahoma*

05.03.04

**Khandaker,Morshed** *University of Central Oklahoma*

05.08.15

05.08.17

**Khodadashian,Sasan** *University of Central Oklahoma*

05.03.08

**Kidd,Shaman** *Northeastern State University*

05.04.01

**Killam,Kameron** *Tulsa Community College*

05.03.51

05.03.52

05.03.53

**Kim,Mikyung** *University of Central Oklahoma*

03.03.16

**Kim,MinSeong** *University of Central Oklahoma*

05.08.31

**Kim,Sung-Kun** *Northeastern State University*

05.05.12

05.05.11

05.05.13

**Kim,Heeeun** *Southwestern Oklahoma State University*

04.09.01

**Kimble,Shane** *Other*

05.02.11

**Kimmel,Laura** *University of Central Oklahoma*

05.03.63

**Kinder,Carlene** *Southwestern Oklahoma State University*

05.03.118

05.03.113

**Kinders,Mark** *University of Central Oklahoma*

05.18.06

**King,Stephen** *Tulsa Community College*

05.03.51

**King,Kama** *University of Central Oklahoma*

05.10.07

**King,Chad** *University of Central Oklahoma*

05.03.44

05.03.47

05.03.54

**King,Stephen** *Tulsa Community College*  
 05.03.52  
**King,Blake** *Tulsa Community College*  
 05.03.53  
**King Jr.,Troy** *Oklahoma State University*  
 05.11.04  
**Kingfisher,Christy** *Northeastern State University*  
 05.03.69  
**Kirk,Dianne** *Northeastern State University*  
 05.02.10  
 05.03.116  
**Kirk,Mark** *Northeastern State University*  
 05.17.26  
**Kizzia,Savannah** *University of Central Oklahoma*  
 01.07.06  
**Klempay,Benjamin** *Other*  
 05.03.76  
**Klevgard,Hunter** *University of Central Oklahoma*  
 05.17.28  
**Klingelhofer,Nerissa** *Northeastern State University*  
 05.14.04  
**Knight,Joshua** *University of Central Oklahoma*  
 05.03.95  
**Koehn,Sadie** *Northwestern State University*  
 05.03.25  
**Koehn,Chassidee** *Northwestern State University*  
 05.03.17  
**Kollmorgen,Lauren** *Oklahoma State University*  
 05.18.11  
**Kotturi,Hari** *University of Central Oklahoma*  
 05.03.04  
 05.03.74  
 05.03.127  
**Kovatana,Komes** *University of Central Oklahoma*  
 05.06.08  
 05.06.06  
 05.06.07  
**Krishnan,Sivarama** *University of Central Oklahoma*  
 01.04.01  
**Kshetri,Pratiksha** *University of Central Oklahoma*  
 05.03.49  
 05.03.75  
**Kuns,Brooke** *University of Central Oklahoma*  
 02.02.03  
**Kunz,Yuliya** *Northeastern State University*  
 05.03.83  
 05.03.89

## L

**Ladd,Kayla** *Other*  
 05.11.04  
**Ladwig,Sam** *University of Central Oklahoma*  
 03.03.13  
**Lai,Hung-Lin** *University of Central Oklahoma*  
 01.07.01

**Lajaunie,Angelica** *Southwestern Oklahoma State University*

05.15.02

05.15.03

**Lam,Ahn** *University of Central Oklahoma*

05.05.10

05.03.87

05.08.28

**Lama,Lakpa** *Other*

05.03.71

**Lama,Bibash** *University of Central Oklahoma*

05.06.32

**Lambo-Akanbi,Ismail** *University of Central Oklahoma*

05.08.37

**LaMere,Kaitlyn** *University of Central Oklahoma*

05.03.47

**Lamichhane,Rakshya** *University of Central Oklahoma*

05.08.27

**Landry,Debbie** *Northeastern State University*

02.01.17

**Lane-Harvard,Liz** *University of Central Oklahoma*

05.13.21

05.13.04

**Lasiter,Faith** *East Central University*

04.08.09

**Laverty,Sean** *University of Central Oklahoma*

05.13.24

05.13.23

**LaVictoire,Rebecca** *Other*

05.03.43

**Lavine,Barry** *Oklahoma State University*

05.05.06

**Law,Ting Wei** *University of Central Oklahoma*

05.03.60

05.08.10

05.08.41

**Lawrence,Jacintha** *University of Central Oklahoma*

05.13.06

**Layton,Elivia** *University of Central Oklahoma*

05.08.01

05.08.28

**Lee,Jeongmin** *Southwestern Oklahoma State University*

04.09.01

**Lee,Michael** *Oklahoma School of Science and Mathematics*

05.05.22

**Leffler,Emma** *Southwestern Oklahoma State University*

05.15.02

05.15.03

**Legg,Peyton** *University of Central Oklahoma*

05.13.16

**Lemley,Evan** *University of Central Oklahoma*

05.08.35

05.08.22

**Lewis,Dalton** *Other*

05.05.01

05.05.32

**Li,Hong** *Cameron University*  
05.13.07  
**Li,Fang** *University of Central Oklahoma*  
05.06.03  
**Li,Fengmin** *Other*  
05.05.18  
**Lighthizer,Jenna** *Northeastern State University*  
05.14.10  
**Lim,Irene** *Other*  
05.03.76  
**Limke,Alicia** *University of Central Oklahoma*  
05.17.13  
05.17.21  
**Lin,Jiajun** *East Central University*  
01.02.06  
**Lindblade,Dawn** *University of Central Oklahoma*  
03.05.03  
**Lindsey,BreAnn** *University of Central Oklahoma*  
05.17.15  
**Lippard,Delaney** *East Central University*  
04.07.14  
**Little,Stephanie** *Northwestern State University*  
05.12.03  
**Littlefield,Michelle** *University of Central Oklahoma*  
05.03.07  
**Liu,Tao** *University of Central Oklahoma*  
05.06.25  
**Liu,Jianguo** *University of Central Oklahoma*  
05.05.34  
05.05.06  
**Locke,Travis** *University of Central Oklahoma*  
05.08.26  
**Lockyear,Nicholas** *Southwestern Oklahoma State University*  
05.15.02  
05.15.03  
**Loftiss,Migmar** *University of Central Oklahoma*  
02.01.02  
**Looper,Anna** *Northwestern State University*  
02.04.03  
**Lopez,Christopher** *Northeastern State University*  
05.06.15  
**Lorah,Garrett** *University of Central Oklahoma*  
05.08.15  
**Lord,Wayne** *University of Central Oklahoma*  
05.10.07  
05.03.130  
**Lovallo,William** *University of Oklahoma*  
05.17.08  
**Love,Casey** *Southeastern Oklahoma State University*  
05.03.02  
05.03.79  
**Lozano-DeAos,Pedro** *Oklahoma School of Science and Mathematics*  
05.05.07

**Iudlum,marty** *University of Central Oklahoma*  
01.02.03  
01.02.02  
**Luongo,Anthony** *Northeastern State University*  
02.03.18  
**Lutter,Erika** *Oklahoma State University*  
05.03.104  
05.03.117  
05.03.34  
**Lutz,James** *Cameron University*  
05.05.35  
**Lutzu,Giovanni Antonio** *Oklahoma State University*  
05.08.33  
**Luu,Jesse** *University of Central Oklahoma*  
01.05.03  
**Lyon,Maximilian** *University of Central Oklahoma*  
05.03.08

## M

**Mace,James** *Cameron University*  
03.04.09  
**Magee,Abigail** *University of Central Oklahoma*  
05.08.26  
**Mahieu,Jennifer** *Other*  
02.04.01  
05.03.23  
05.03.09  
05.15.01  
02.04.05  
02.04.04  
05.03.17  
05.12.03  
02.04.02  
05.03.27  
**Maier,Elizabeth** *University of Central Oklahoma*  
04.09.02  
**Mallula,Maija** *Other*  
05.03.76  
**Manral,Lalit** *University of Central Oklahoma*  
01.06.06  
**Markwardt,Kelly** *Tulsa Community College*  
05.12.01  
**Marlow-Fuson,Skylar** *University of Central Oklahoma*  
04.07.11  
**Martin,Jessica** *Northeastern State University*  
05.05.38  
**Massengale,Braxton** *Tulsa Community College*  
05.03.42  
**Matheny,Audrey** *University of Central Oklahoma*  
05.03.63  
05.03.64  
**Mather,Robert** *University of Central Oklahoma*  
05.17.05  
02.03.10  
05.17.19  
05.17.07

**Mathis,James** *University of Central Oklahoma*  
05.08.37  
**Maxwell,Matt** *Southeastern Oklahoma State University*  
05.03.79  
**Mayhew,Lauren** *University of Central Oklahoma*  
03.03.10  
**McCarthy,Molly** *University of Central Oklahoma*  
02.01.04  
**McCay,Kathleen** *Northeastern State University*  
02.01.13  
**McClanahan,Barbara** *Southeastern Oklahoma State University*  
02.01.15  
**McCoy,Liliya** *University of Central Oklahoma*  
05.13.15  
**Mcdowell,Dr. Kathi** *Northeastern State University*  
05.03.123  
05.03.94  
05.03.88  
05.03.90  
05.03.91  
05.03.131  
05.03.86  
**McElreath,Caitlyn** *University of Central Oklahoma*  
05.10.07  
**McGill,Connor** *University of Central Oklahoma*  
05.03.80  
**McGloster,Danielle** *University of Central Oklahoma*  
02.01.02  
**McGrane,Regina** *Southwestern Oklahoma State University*  
05.03.62  
**McGregor,Erin** *University of Central Oklahoma*  
04.05.02  
**McGuire,Cody** *University of Central Oklahoma*  
05.06.08  
**McInnes,Daniel** *East Central University*  
05.05.09  
**McKaig,Michael** *University of Central Oklahoma*  
02.01.08  
**McKee,Dr. Victoria** *University of Central Oklahoma*  
01.06.03  
01.06.02  
**McLain,William** *University of Central Oklahoma*  
05.06.21  
**McLane,Chad** *Northeastern State University*  
02.01.13  
**McNamar,Rachel** *University of Central Oklahoma*  
05.03.56  
**Mcneil,Aaron** *University of Central Oklahoma*  
04.07.07  
**Mecoy,William** *University of Central Oklahoma*  
01.03.01  
**Medina,Carol** *Northwestern State University*  
02.04.03  
**Medlin,Laura** *Northeastern State University*  
05.14.01



**Meier,Andy** *University of Central Oklahoma*  
05.08.35

**Mendoza,George** *Northwestern State University*  
05.12.03

**Merritt,Kimberly** *Oklahoma Christian University*  
01.06.02

**Mesiya,Sidra** *University of Central Oklahoma*  
05.05.24

**Metts,Michalea** *University of Central Oklahoma*  
05.03.07

**Mhlanga,Keith** *University of Central Oklahoma*  
01.03.05

**Miller,Ron** *University of Central Oklahoma*  
05.08.06  
05.08.32

**Miller,Jeff** *Northeastern State University*  
05.14.08

**Miller,Sonnie** *Cameron University*  
03.04.04  
03.04.14

**Miller,Dr. Lisa** *University of Central Oklahoma*  
01.05.01

**Miller,Autumn** *University of Central Oklahoma*  
03.03.09

**Milligan,Thomas** *University of Central Oklahoma*  
05.13.04  
05.13.05

**Mirll,Teresa** *University of Central Oklahoma*  
04.02.02

**Mitchell,Deja** *University of Central Oklahoma*  
04.08.27

**Moeckel,Daltyn** *University of Central Oklahoma*  
03.03.12

**Molinar,Nancy** *Northeastern State University*  
05.14.06

**Montalvo,Daniel** *University of Central Oklahoma*  
05.05.06

**Morris,Tracy L.** *University of Central Oklahoma*  
05.18.19  
05.18.06  
05.18.07  
05.18.08

**Morris,Shelby** *University of Central Oklahoma*  
05.08.42

**Morris,Isaac** *East Central University*  
04.08.13

**Morrison,Jennifer** *Cameron University*  
02.05.02

**Moseley,Elsa** *East Central University*  
04.08.17

**Mouliom,Aminatou** *Southwestern Oklahoma State University*  
05.15.03

**Moussa,Dr. Abdellah** *University of Central Oklahoma*  
05.08.03

**Moyer,Tandi** *Northwestern State University*  
05.03.27  
**Msovela,Nuru jacqueline** *East Central University*  
04.08.22  
**Mundende,Kangwa** *University of Central Oklahoma*  
03.05.03  
**Muralitharan,Danita** *University of Central Oklahoma*  
01.02.05  
**Murphree,Jessica** *University of Oklahoma*  
05.03.129  
**Murphy,Erinn** *University of Central Oklahoma*  
05.03.06  
**Murray,Cynthia** *University of Central Oklahoma*  
05.18.02  
05.18.03  
05.18.09  
05.18.05  
05.18.04  
**Musgrove,Olivia** *University of Central Oklahoma*  
03.01.02  
03.01.10  
**Mussa,Huda** *University of Oklahoma*  
05.11.05  
**Myers,Brittany** *University of Central Oklahoma*  
05.13.10  
**Myers,Dwight** *East Central University*  
05.05.36

## N

**Nagireddy,Varun reddy** *Southwestern Oklahoma State University*  
05.06.31  
**Nalley,Elizabeth** *Cameron University*  
05.05.20  
05.05.19  
05.05.37  
05.05.17  
**Naumann,Kelsey** *Other*  
02.03.21  
02.03.11  
**Nchinda,Hedrine** *University of Central Oklahoma*  
05.08.37  
**Neese,Ashley** *University of Central Oklahoma*  
01.07.01  
01.07.03  
**Nehmzow,Katherine** *Tulsa Community College*  
05.03.51  
**Nelson,Mike** *University of Central Oklahoma*  
02.01.03  
**Nesbit,April** *East Central University*  
05.03.30  
**Nesmith,Blake** *University of Central Oklahoma*  
05.17.06  
**New,Dallas** *University of Central Oklahoma*  
05.03.127

**Newton,David** *University of Central Oklahoma*  
05.17.12  
04.09.02  
**Ngo,Brandon** *University of Central Oklahoma*  
01.03.07  
**Nguyen,Hoang** *University of Central Oklahoma*  
05.08.06  
05.08.16  
01.07.02  
**Nguyen,Julie** *Cameron University*  
02.01.01  
04.02.01  
**Nguyen,Minh-Hang** *University of Central Oklahoma*  
01.07.05  
**Nguyen,Don** *University of Central Oklahoma*  
05.06.08  
**Nguyen,Ti** *University of Central Oklahoma*  
03.03.11  
**Nguyen,Vina** *University of Central Oklahoma*  
05.03.57  
**Nicoll,Paage** *Southwestern Oklahoma State University*  
05.03.96  
**Nielsen,Jessica** *Other*  
05.03.20  
**Nissen,Tim** *Oklahoma State University*  
02.03.20  
05.18.12  
05.18.15  
**Noble,Tyler** *Tulsa Community College*  
05.03.52  
**Norris,Caleb** *University of Central Oklahoma*  
05.13.03  
**Northrip,Jessica** *Cameron University*  
03.04.07  
**Nuguri,Sona** *Oklahoma School of Science and Mathematics*  
05.05.22  
**Nziazi Lutumba,Tom Jones** *Southeastern Oklahoma State University*  
01.04.12

## O

**O'Connor,Jennifer** *Northeastern State University*  
05.18.01  
**Odam,Seth** *Southwestern Oklahoma State University*  
02.03.28  
**Oke,Ayodele** *Other*  
02.04.04  
**Olheiser,Tyler** *University of Central Oklahoma*  
05.08.21  
**Oligher,William** *Cameron University*  
01.04.11  
**olive,marcus** *Northeastern State University*  
01.02.07  
**Olmstead,Justin** *University of Central Oklahoma*  
04.07.13

**Olsen,Dr. Jacilyn** *University of Central Oklahoma*

05.05.06

02.01.02

**Olsen,Alena** *Other*

05.03.76

**Omer,Mohammed** *Cameron University*

03.04.12

**Onyedili,Humphrey** *Other*

02.04.04

**Orr,Austin** *East Central University*

04.08.15

**Osburn,Felicia** *University of Central Oklahoma*

05.03.07

**Ovrebo,Clark** *University of Central Oklahoma*

05.03.127

**Ozturk,Ahmet** *Northeastern State University*

02.05.01

## P

**Pac,Teresa** *University of Central Oklahoma*

03.01.10

**Pack,Latricia** *Northeastern State University*

05.14.10

**Pak,Cameron** *University of Central Oklahoma*

05.08.18

05.13.16

**Pan,Amanda** *Oklahoma School of Science and Mathematics*

05.05.21

**Panta,Sagun** *Cameron University*

05.13.01

**Pantoja,Joana** *University of Central Oklahoma*

05.03.55

**Papayik,Jason** *University of Central Oklahoma*

05.13.19

**Pappas,Abigail** *University of Central Oklahoma*

03.05.02

03.05.03

**Pappas,Christine** *East Central University*

04.08.16

**Park,Kristen** *Other*

05.03.76

**Pate,Anne** *Southwestern Oklahoma State University*

02.03.28

02.03.24

**Patel,Akash** *University of Central Oklahoma*

02.01.03

**Patton,Christopher** *University of Central Oklahoma*

05.03.04

05.05.15

**Payne,Brandon** *Cameron University*

05.13.18

**Paynter,Bradley** *University of Central Oklahoma*

05.08.18

05.13.15

05.13.16

**Peake,Ian** *Northeastern State University*  
05.03.93

**Pearce,Keith** *Southeastern Oklahoma State University*  
05.06.04

**Pearce,Riley** *Northwestern State University*  
04.08.02

**Peetoom,Jaci** *Southeastern Oklahoma State University*  
05.02.11

**Penning,Cole** *University of Central Oklahoma*  
05.06.08

**Pepper,Cody** *University of Central Oklahoma*  
01.03.10

**Petanidou,Theodora** *Other*  
05.03.76

**Peters,Siriporn** *Southwestern Oklahoma State University*  
03.03.02  
03.03.03

**Petrilla,Ariel** *University of Central Oklahoma*  
05.03.133

**Pettitt,Alex** *University of Central Oklahoma*  
05.08.25

**Petty,Brittney** *University of Central Oklahoma*  
01.03.03

**Pham,Tuan** *University of Central Oklahoma*  
01.07.04

**Pham,Bao-Tran** *Other*  
05.14.03

**Phares,Dean** *Southwestern Oklahoma State University*  
05.06.16

**Philip,Timothy** *Other*  
05.13.14

**Philpott,Caroline** *Other*  
05.05.18

**Pickens,Ashley** *Southwestern Oklahoma State University*  
05.05.08

**Pittman,Ian** *East Central University*  
04.08.24

**Pokharel,Shibir** *University of Central Oklahoma*  
05.08.27

**Postoak,Brandon** *East Central University*  
05.03.30

**Potvin,Victoria** *University of Central Oklahoma*  
05.06.23

**Poudel,Abhaya** *Cameron University*  
05.13.07

**Powell,Laura** *University of Central Oklahoma*  
05.03.78

**Powers,Dr. Melissa** *University of Central Oklahoma*  
02.02.02  
02.01.03

**Prajapati,Rojina Prajapati** *East Central University*  
05.03.109

**Price,Audrey** *University of Central Oklahoma*  
02.03.16

**Prim,Alexa** *University of Central Oklahoma*  
05.10.07  
05.03.130  
**Proctor,Alissa** *Northeastern State University*  
05.14.02  
**Puchala,Richard** *Langston University*  
05.02.05  
05.02.07  
05.02.03  
05.02.06  
05.02.04  
05.02.08  
**Pybas,Shelby** *University of Central Oklahoma*  
01.03.05

## Q

**Qayyum,Arif** *Cameron University*  
01.04.06  
01.04.05  
01.04.08  
01.04.10  
01.04.04  
01.04.07  
01.04.11  
**Qian,Gang** *University of Central Oklahoma*  
05.06.25  
05.06.27  
05.06.26  
**Qian,Lie** *Southeastern Oklahoma State University*  
05.06.09

## R

**Rahman,A.K.Fazlur** *Oklahoma School of Science and Mathematics*  
05.05.23  
05.05.21  
05.05.22  
05.05.07  
05.05.31  
**Ramadani,Moataz** *University of Central Oklahoma*  
05.08.29  
**Rana,Jashmon** *Cameron University*  
05.13.27  
05.13.26  
**Rankin,Justin** *Other*  
02.03.21  
02.03.11  
**Rassouli-Currier,Susanne** *University of Central Oklahoma*  
01.03.08  
01.06.04  
**Ratzlaff,Chase** *Northeastern State University*  
02.03.26  
**Ray,Cecelia** *Rogers State University*  
05.17.26  
**Ray,Angelica** *University of Central Oklahoma*  
05.17.02  
**Redus,Brady** *University of Central Oklahoma*  
05.12.02

**Reese,Joshua** *Northeastern State University*  
05.03.73

**Rehman,Omer** *Cameron University*  
01.04.06

**Reilly,Rebecca** *Northwestern State University*  
05.03.09

**Reith,Vicky** *Other*  
05.03.03

**Remy-Schumacher,Tess** *University of Central Oklahoma*  
03.05.01

**Renfro,Derek** *University of Central Oklahoma*  
05.06.23

**Riahinezhad,shahram** *University of Central Oklahoma*  
05.08.20

**Rice,Samantha** *Tulsa Community College*  
05.03.52  
05.03.53

**RICHARDS,AMY** *Other*  
05.03.03

**Riddle,Skylar** *East Central University*  
04.08.26

**Riepl,Lauren** *University of Central Oklahoma*  
04.07.10

**Ritt,Edith** *University of Central Oklahoma*  
04.07.02

**Rittner,Dr. Linda** *University of Central Oklahoma*  
02.01.12

**Rivas,Alexander** *Cameron University*  
05.05.18  
05.05.17

**Robertson,Kristi** *University of Central Oklahoma*  
02.01.10  
02.01.09

**Robertson,Ashley** *Southwestern Oklahoma State University*  
05.03.96

**Robinson,Cody** *Northeastern State University*  
02.06.01

**Rodriguez,Solena** *Northwestern State University*  
05.03.18

**Roeder,Diane** *University of Oklahoma*  
05.19.07

**Rojo,Lindsey** *Northeastern State University*  
05.05.30

**Romine,Brooke** *Oklahoma State University*  
05.03.117

**Roostaeyan,Omid** *University of Oklahoma*  
05.03.97

**Rose,Piper** *University of Central Oklahoma*  
05.08.21

**Rosener,William** *Northeastern State University*  
01.05.02

**Ross,Andrew** *Oklahoma State University*  
05.18.17

**Ross,Lauren** *University of Central Oklahoma*  
03.01.03

**Ross, Antonio** *University of Central Oklahoma*  
02.03.06  
**Rouse, Jack** *Other*  
05.08.06  
**Rowsey, Tyler** *East Central University*  
05.03.105  
**Rucci, Gabriel** *University of Central Oklahoma*  
05.03.61  
**Rudolph, Brittany** *University of Central Oklahoma*  
01.07.06  
**Rupakheti, Sujana** *Cameron University*  
05.05.20  
**Ruskoski, Sallie** *Northeastern State University*  
05.02.10  
05.03.116  
**Russell, Charles** *East Central University*  
05.05.09  
**Russell, George** *Oklahoma State University*  
05.03.120  
**Rymer, Nick** *Southwestern Oklahoma State University*  
05.08.34

## S

**Sahlu, Tilahun** *Langston University*  
05.02.05  
05.02.07  
05.02.03  
05.02.06  
05.02.02  
05.02.04  
05.02.08  
**Saiedi, Summer** *University of Central Oklahoma*  
05.08.38  
**Saleh, Alaa alluohammed** *University of Central Oklahoma*  
05.08.27  
**Salkeld, Patrick** *University of Central Oklahoma*  
04.07.06  
**Salmon, Thomas** *Northeastern State University*  
04.08.12  
05.14.03  
**Salmon, Erika** *Northeastern State University*  
04.08.12  
04.02.06  
**Saluja, Prabhjyot** *Southwestern Oklahoma State University*  
05.06.17  
**Sanchez, Zachary** *Other*  
02.03.15  
02.03.21  
02.03.11  
**Sanders, Jessica** *University of Central Oklahoma*  
05.18.07  
05.18.08  
**Sanghera, Dharambir** *University of Oklahoma*  
05.11.05  
**Sapkota, Bishwa** *University of Oklahoma*  
05.11.05



**Satchell,Angeline** *University of Central Oklahoma*  
05.03.08  
**Saulnier,Abraham** *University of Central Oklahoma*  
05.08.07  
**Savage,Caleb** *East Central University*  
04.08.07  
**Sawyer,Elaine** *University of Central Oklahoma*  
05.03.127  
**Schanbacher,Carrie** *Northwestern State University*  
02.04.02  
**Scheckel,Caleb** *Oklahoma State University*  
02.03.19  
**Scheurer,Stacey** *Southwestern Oklahoma State University*  
04.08.23  
**Schmidt,Alexander** *Northeastern State University*  
05.05.13  
**Schmoker,Megan** *Northeastern State University*  
05.14.08  
**Schnelle,Natalie** *University of Central Oklahoma*  
05.13.08  
**Schroeder,Kayla** *Northeastern State University*  
05.11.02  
**Scott,Jared** *Oklahoma State University*  
02.03.23  
02.03.13  
05.03.84  
**Scott,Jenn** *University of Central Oklahoma*  
05.16.03  
05.17.21  
05.17.28  
05.17.03  
05.17.11  
05.17.04  
05.17.09  
05.17.25  
**Scrivner,Coltan** *University of Central Oklahoma*  
05.10.03  
**Seagraves,Nikki** *University of Central Oklahoma*  
05.03.101  
05.03.111  
05.03.99  
05.03.106  
05.03.102  
05.03.100  
**Seale,Jeremy** *University of Central Oklahoma*  
05.12.02  
**Sealey-Holtz,Dr. Linda** *University of Central Oklahoma*  
02.01.02  
**Sears,Dr. Kaye** *University of Central Oklahoma*  
02.02.02  
**Seay,Lillian** *University of Central Oklahoma*  
05.08.32  
**Secrest,Nicole** *Cameron University*  
01.04.07  
01.04.11

**Sein,Win** *University of Central Oklahoma*  
01.05.01  
**Settles,Valerie** *University of Central Oklahoma*  
03.03.05  
**Sewell,Kayla** *University of Central Oklahoma*  
01.07.04  
**Shaffer,Nicolas** *University of Central Oklahoma*  
05.05.06  
**Shahan,Justin** *Southeastern Oklahoma State University*  
05.03.16  
**Shahan,,Kathlyn** *Northeastern State University*  
04.09.04  
**Shakya,Kritika** *University of Central Oklahoma*  
02.03.12  
**Sharkey,Krishtian** *Cameron University*  
01.04.08  
01.04.10  
**Sharp,Patrick** *Southeastern Oklahoma State University*  
05.03.02  
**Sharp,Christopher** *University of Central Oklahoma*  
05.13.20  
**Shaughnessy,Michael** *Northeastern State University*  
05.02.09  
**Sheetz-Nguyen,Jessica** *University of Central Oklahoma*  
04.07.01  
**Shepherd,Amber** *Cameron University*  
03.04.03  
03.04.13  
**Sherwood,Heather** *University of Central Oklahoma*  
05.17.05  
05.17.07  
**Shetler,Joseph** *Northeastern State University*  
05.14.01  
**Shiraiwa,Shikoh** *University of Central Oklahoma*  
03.01.09  
03.01.08  
03.01.14  
**Shirali,Yasmin** *University of Central Oklahoma*  
05.17.11  
05.17.09  
05.17.01  
**Short,Jacob** *Cameron University*  
01.04.10  
**Short,Madelynne** *University of Central Oklahoma*  
03.05.03  
**Shrestha,Sabina** *East Central University*  
05.03.109  
**Shuff,Jalea** *University of Central Oklahoma*  
02.02.01  
**Shukla,Rashi** *University of Central Oklahoma*  
04.09.02  
04.09.03

**Silk,Kegan** *University of Central Oklahoma*  
05.08.25  
05.08.01  
05.03.87  
**Silva,Daniela** *University of Central Oklahoma*  
05.03.81  
05.03.76  
**Silva,Nhayandra** *Langston University*  
05.02.02  
**Simms,Matthew** *Oklahoma State University*  
05.03.84  
**Simo,Jean** *University of Central Oklahoma*  
02.03.08  
**Simon,Scott** *Northeastern State University*  
05.14.12  
**Simon,Nicholas** *Langston University*  
05.03.98  
**Sims,Jeanetta** *University of Central Oklahoma*  
01.07.01  
**Sims,Matt** *Other*  
02.03.15  
02.03.23  
02.03.13  
**Sims,Jeanetta** *University of Central Oklahoma*  
02.01.10  
01.06.01  
01.07.05  
01.07.03  
02.02.01  
02.01.09  
01.07.06  
01.07.04  
**Sims,Atoya** *University of Central Oklahoma*  
01.06.01  
**Sims,Matt** *Other*  
02.03.14  
**Simsek,Zinar** *Northeastern State University*  
05.03.85  
**Skelton,Elle** *University of Central Oklahoma*  
02.01.03  
**Skipper,Cody** *University of Central Oklahoma*  
05.08.38  
**Skorupski,Taylor** *Northeastern State University*  
05.03.15  
**Sloan,Dusti** *Tulsa Community College*  
05.03.53  
**Smith,Diana** *University of Central Oklahoma*  
05.08.38  
**Smith,Josh** *University of Central Oklahoma*  
05.03.08  
**Smith,Elizabeth** *University of Central Oklahoma*  
05.10.04  
**Smith,Melinda** *Northeastern State University*  
02.01.15

**Smoot, Devin** *Southwestern Oklahoma State University*  
05.06.28

**Soderberg, Alicia** *Other*  
05.16.02

**Song, Samuel** *University of Central Oklahoma*  
05.06.20

**Spence, Jenna** *University of Central Oklahoma*  
03.01.17  
03.01.18  
03.01.16

**Spencer, Diana** *Tulsa Community College*  
05.03.51  
05.03.52

**Spomer, Jaclyn** *University of Central Oklahoma*  
02.06.02

**Spradlin, Haley** *University of Central Oklahoma*  
03.03.07

**Stafford, Lauren** *East Central University*  
04.08.11

**Stamper, Kyle** *University of Central Oklahoma*  
05.08.16

**Standley, Olaf** *Northeastern State University*  
02.01.13

**Steele, Kyle** *University of Central Oklahoma*  
05.13.16

**Stelling, Merilee** *Northwestern State University*  
05.03.45

**Stephen, Olivia** *University of Central Oklahoma*  
05.03.128

**Stevenson, Justin** *East Central University*  
04.08.25  
04.08.24

**Stie, F.** *Tulsa Community College*  
05.19.02

**Stokes, Jared** *Cameron University*  
05.19.07

**Stone, Paul** *University of Central Oklahoma*  
05.03.50  
05.03.48

**Stoneberg, Danielle** *University of Central Oklahoma*  
04.09.03

**Stout, Jerry** *Southeastern Oklahoma State University*  
02.01.15

**Strain, Ashley** *Northeastern State University*  
05.03.72

**Stringfield, Virgil** *University of Central Oklahoma*  
05.06.08

**Su, Ming-Shan** *Southeastern Oklahoma State University*  
05.06.04

**Subedi, Utsab** *Cameron University*  
02.05.02

**Sullivan, Jonathan** *Northeastern State University*  
05.03.31

**Sultana, Fariha** *University of Central Oklahoma*  
05.08.17

**Summers,Blair** *University of Central Oklahoma*

03.01.04

**Sun,Jianguo** *Other*

05.18.13

**Sundy,Kristina** *University of Central Oklahoma*

05.08.02

**Sung,Hong** *University of Central Oklahoma*

05.06.06

05.06.07

**Sutter,Ben** *University of Central Oklahoma*

05.03.06

**Swanson,Mark** *Tulsa Community College*

05.03.42

**Swanson,Zane** *University of Central Oklahoma*

01.01.03

## T

**Taher,Ibrahim** *Other*

05.03.07

**Takyi-Micah,Melinda** *University of Central Oklahoma*

05.18.10

**Tappert,Mary** *University of Central Oklahoma*

05.03.01

**Tarpey,Karina** *East Central University*

04.02.05

**Tatah,Canisia** *Southwestern Oklahoma State University*

05.03.96

05.03.97

**Tatum,Baylee** *University of Central Oklahoma*

05.03.46

05.03.06

**Tavares Pereira,Diego** *University of Central Oklahoma*

05.06.05

**Taylor,Amelia** *Northeastern State University*

05.03.68

**Tedford,Kinsey** *University of Central Oklahoma*

05.19.01

**Teigland,Tucker** *University of Central Oklahoma*

05.08.43

**Telemeco,Rory** *Other*

05.03.80

**Thapa,Narayan** *Cameron University*

05.13.13

05.13.26

**Thetford,Mary** *University of Central Oklahoma*

05.03.101

**Thomas,Lenorad** *Other*

05.05.24

**Thomas,Masala** *University of Central Oklahoma*

02.01.10

02.01.09

**Thomas,Gary** *University of Central Oklahoma*

05.03.63

**Thompson,Andrea** *Northwestern State University*

05.03.23

**Thorman,Trevor** *Northeastern State University*  
 05.05.39  
**Thurm,Maranda** *University of Central Oklahoma*  
 03.03.08  
**Thurman,Hailey** *Northeastern State University*  
 05.17.24  
 02.06.01  
**Tilford,Dana** *University of Central Oklahoma*  
 01.03.04  
**Tinnin,Lauren** *University of Central Oklahoma*  
 05.08.29  
 05.08.10  
 05.08.41  
 05.08.39  
 05.08.40  
**Tomasu,Kevin** *Northeastern State University*  
 05.14.11  
**Torzilli,Robert** *University of Central Oklahoma*  
 05.08.07  
 05.08.04  
**Tozzio,Mark** *Northeastern State University*  
 02.03.27  
**Tran,Huyen** *University of Central Oklahoma*  
 05.03.24  
**Traxler,Tylor** *University of Central Oklahoma*  
 01.03.07  
**Troupe,Rashid** *Langston University*  
 05.03.92  
**Trubitsyn,Denis** *Southwestern Oklahoma State University*  
 05.03.118  
 05.03.113  
 05.02.11  
**Tsukahara,Yoko** *Langston University*  
 05.02.07  
 05.02.06  
 05.02.02  
 05.02.08  
**Turgut Dunford,Nurhan** *Oklahoma Christian University*  
 05.08.33  
**Twyman rack,Hayley** *University of Central Oklahoma*  
 05.17.16  
 05.17.17  
 05.17.18  
**Tyler,Karl** *University of Central Oklahoma*  
 02.01.10  
 02.01.09

## U

**Ubeidat,Muatasem** *Southwestern Oklahoma State University*  
 05.03.96  
**Umberham,Blake** *Oklahoma State University*  
 05.18.11  
 02.03.21  
 02.03.11  
**Underwood,Nichollette** *Northeastern State University*  
 05.11.03

**Urge,Mengistu** *Langston University*

05.02.03

**Usman,Amna** *Northeastern State University*

05.03.86

## V

**Van Den Handel,Cheryl** *Northeastern State University*

04.08.01

**Vanhoy,Mickie** *University of Central Oklahoma*

05.17.28

05.17.03

05.17.11

05.17.04

05.17.09

05.17.01

05.17.25

**Vantrease,Amy** *Southwestern Oklahoma State University*

05.06.18

**Varghese,Joby** *University of Central Oklahoma*

05.06.08

**Vassar,Matt** *Other*

02.03.15

02.03.20

05.18.17

02.03.23

02.03.13

05.18.11

02.03.21

05.03.84

05.18.12

05.18.15

05.18.18

02.03.14

05.03.120

02.03.01

02.03.11

**Vaughan,Melville** *University of Central Oklahoma*

05.03.55

05.03.60

05.08.26

05.08.36

05.03.128

05.08.17

05.08.10

05.08.19

05.03.56

05.08.41

05.03.49

05.03.57

05.03.75

05.03.61

**Velarde,Tera** *Cameron University*

01.04.07

**Vo,Dat** *University of Central Oklahoma*

05.08.06

**Vo,Cindy** *University of Central Oklahoma*

01.07.05

**Voigt, Kevin** *Northeastern State University*

05.14.09

**Vu, Thao** *University of Central Oklahoma*

03.03.06

**Vu Tran, Mai Anh** *Northeastern State University*

05.08.08

05.08.09

## W

**Wagner, Alex** *University of Central Oklahoma*

05.08.07

**Wagner, Nikolas** *University of Central Oklahoma*

05.08.04

**Walker, Nick** *University of Central Oklahoma*

05.08.26

05.08.36

**Walker, Kenneth** *University of Central Oklahoma*

01.05.04

**Wang, Kevin** *Northeastern State University*

05.03.10

05.03.15

**Wang, Yuxuan** *University of Central Oklahoma*

05.06.24

**Wang, Zaisen** *Langston University*

05.02.07

05.02.08

**Wang, Kevin** *Northeastern State University*

05.10.02

05.03.11

05.04.01

05.03.72

05.03.73

**Ward, Jordan** *University of Central Oklahoma*

02.03.06

**Ward, Abigail** *University of Central Oklahoma*

05.03.127

**Ware, Orgel** *University of Central Oklahoma*

05.03.99

**Washburn, Sam** *University of Central Oklahoma*

03.03.04

**Washburn, Shane** *University of Central Oklahoma*

05.13.16

**Waters, Megan** *Other*

05.03.71

**Watkins, Brad** *University of Central Oklahoma*

04.05.01

04.05.03

04.05.02

**Watson, Jamie** *University of Central Oklahoma*

05.03.100

**Waugh, Katelyn** *Northwestern State University*

05.03.23

**Wayant, Christian** *Oklahoma State University*

05.18.12

02.03.20

05.18.15



**Weathers,Danna** *Other*

05.03.03

**Webb,Ariel** *University of Central Oklahoma*

01.03.04

05.18.07

05.18.08

**Wells,Kevin** *Northeastern State University*

05.06.10

**Wert-Gray,Stacia** *University of Central Oklahoma*

01.02.05

**West,Connor** *University of Central Oklahoma*

05.08.25

05.08.01

05.03.87

**West,Michael** *Other*

05.16.02

**West,Dylan** *East Central University*

04.08.20

**Westerman,Deanna** *Northwestern State University*

02.04.03

**Wheeler,Denna** *Oklahoma State University*

02.03.20

05.18.12

05.18.15

**Wheeler,Cortney** *Other*

05.03.20

**Whisenhunt,Mandi** *Northeastern State University*

05.14.01

**Whitby,Paul** *University of Oklahoma*

05.11.05

**White,Melinda** *Northeastern State University*

05.03.94

05.03.86

**Whitebird,Alona** *University of Central Oklahoma*

04.07.09

**Whittle,Charles** *Northeastern State University*

02.03.18

**wickham,jason** *Northwestern State University*

05.05.40

**Widener,Jeremy** *Northeastern State University*

05.03.93

**Widick,Stephanie** *Northwestern State University*

02.01.11

**Wiebe,Jordan** *Oklahoma State University*

02.03.20

05.18.12

05.18.15

**Wiechmann,Paul** *University of Central Oklahoma*

05.06.29

**Wieczorek-Pemberton,Mila** *University of Central Oklahoma*

04.05.03

**Wilhite,Tiffany** *Northwestern State University*

05.03.09

**Williams,Anna** *Northeastern State University*

05.02.09

**Williams,Lindi** *University of Central Oklahoma*  
05.17.28  
**Williams,Mandy** *University of Central Oklahoma*  
05.03.106  
**Williams,Danielle** *University of Central Oklahoma*  
01.07.06  
**Williams,Emily** *East Central University*  
04.08.21  
**wilson,meagan** *University of Central Oklahoma*  
02.03.22  
**Wimer,Natalie** *Cameron University*  
05.13.22  
**Williams,Karen** *East Central University*  
05.16.01  
**Woitte,Susan** *Northeastern State University*  
02.01.13  
**Wooden,Lori** *University of Central Oklahoma*  
03.05.02  
**Wreath,Amy** *Other*  
05.03.20  
**Wright,Heather** *East Central University*  
05.03.30  
**Wright Smith,Linda** *Cameron University*  
03.04.06  
03.04.08  
**Wu,Ning** *Southeastern Oklahoma State University*  
05.03.02  
05.03.12  
05.03.16  
05.03.14  
05.11.01  
**Wu,Hanye** *University of Central Oklahoma*  
05.06.21  
**Wyatt,Kimberry** *Tulsa Community College*  
05.03.05

## X

**Xing,Zhiyuan** *University of Central Oklahoma*  
05.18.19  
**Xu,Gang** *University of Central Oklahoma*  
05.08.05  
05.08.14  
05.08.29  
05.08.23  
05.08.10  
05.08.41  
05.08.04

## Y

**Yadav,Rohan** *University of Central Oklahoma*  
05.08.03  
**Yang,Jennifer** *Tulsa Community College*  
05.03.52  
05.03.53  
**Yen,Ting-An** *University of Central Oklahoma*  
05.05.29

**Yoon,Jeein** *Cameron University*

05.13.09

**You,Lingling** *University of Central Oklahoma*

01.01.02

**Youmbi,Sinthia** *Southwestern Oklahoma State University*

05.03.124

05.03.113

**Young,Jeff** *Oklahoma State University*

05.18.17

## Z

**zachary,josey** *University of Central Oklahoma*

05.08.11

**Zajac-McConaghy,Winifred** *University of Central Oklahoma*

05.03.06

05.03.07

**Zeng,Wenxi** *University of Central Oklahoma*

05.06.02

**Zhang,Chenyue** *East Central University*

01.04.02

**Zhang,Hongkai** *East Central University*

01.04.02

01.02.04

01.02.06

**Zhang,Xixi** *University of Central Oklahoma*

01.03.03

**Zhangs,Maggie** *Oklahoma School of Science and Mathematics*

05.05.21

**Zhao,Qing** *University of Central Oklahoma*

05.06.22

05.06.20

**Zhou,Feifan** *University of Central Oklahoma*

05.05.10

05.08.25

05.08.01

05.03.87

05.08.28

**Zhou,Qingwen** *University of Central Oklahoma*

05.18.03

05.18.04

**Zhu,Zhen** *University of Central Oklahoma*

01.03.03

01.03.06

**Zhu,Dr. Zhen** *University of Central Oklahoma*

01.03.05

**Zinser,Ashley** *Northeastern State University*

05.14.02

**Zodrow,Ashley** *Northeastern State University*

02.03.26