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# 2015 Oklahoma Research Day Full Program

Northeastern State University

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## **Abstracts from the 2015 Oklahoma Research Day**

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

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

##### **01. Accounting**

###### **01.01.01 Accounting Statement Footnotes Contextual Association with Firm Financial Characteristics?**

**azam,habibi** *University of Central Oklahoma*

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

Information quality of financial accounting statements is an issue for readers' decision-making. This project investigates the association of the readability of financial statement management's discussion and analysis (MD&A) and footnotes with the firm's weighted average cost of capital (a key ratio used in firm valuations and investments). The study focuses upon the oil and gas industry in order to include an analysis of "successful efforts" versus "full cost" accounting methods. We use a regression system of two equations. The first equation is based on the premise that firm management/financial statement preparers will act to minimize the weighted accounting average cost of capital (WACC) with respect to their readability of MD&A and footnotes. The second equation posits that the MD&A readability is a function of WACC plus footnote readability characteristics. We also analyze a logistic regression to investigate the impact of WACC information on accounting method choice of "successful efforts" versus "full cost". Results indicate that accounting readability of footnotes does associate with weighted average cost of capital. This study extends readability research into the footnote area. In an unexplored area, the study finds firm financial data impacts the accounting choice of "successful efforts" versus "full cost", but no association is apparent of the method with weighted

###### **01.01.02 COST-VOLUME-PROFIT ANALYSIS**

**Chelsi,Norris** *East Central University*

The objective of this project was to analyze the benefits of a company performing a Cost-Volume-Profit analysis before they began selling products. My thesis for the project involved the question, "Why and when is it important to perform a Cost-Volume-Profit analysis?" In order to explore this thesis, I took an example problem from my Managerial Accounting textbook that involved a hypothetical business determining certain variables of the company that, in the end, constituted a full Cost-Volume-Profit analysis. In determining these variables, I made several calculations and graphs to explain each point. I found that the hypothetical company Success Systems needed to make 60 composite units in order to break-even with their profits and costs. After performing this analysis, the company knows how much product they need to create in order to have a profit. Without this analysis, the company could have risked creating not enough products and becoming bankrupt. Therefore, these analyses need to be performed before a company jumps into creating product and building up costs.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

### **01. Business Administration**

### **02. Business**

#### **01.02.01 Medical Marijuana: A Hodgepodge of State Laws**

**darrell,ford** *University of Central Oklahoma*

**Marty,Ludlum** *University of Central Oklahoma*

Legalized marijuana for medical uses started with California in 1995. Since then, 20 states have enacted a myriad of contradictory laws. All state laws continue to conflict with federal law, where any use of marijuana is prohibited. The paper summarizes the different types of medical marijuana laws and groups them into some common policy areas.

#### **01.02.02 Law School Marketing and Deceptive Advertising**

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

**Marty,Ludlum** *University of Central Oklahoma*

Law schools aggressively compete for students. With the heightened economic pressures, schools have resorted to some less than admirable tactics to gain new students. This paper examines some of the abuses in law school marketing and proposes some modest changes to all law schools to recruit with integrity.

### **01.02.03 FATIGUE and MEDICAL ERRORS**

**darrell,ford** *University of Central Oklahoma*

**Shawn,Keating** *University of Central Oklahoma*

**Taylor,Prado** *University of Central Oklahoma*

This paper examines the relationship between fatigue and errors made by medical professionals. We initially describe fatigue and its effect on judgment and decision making. We then survey the occurrences of fatigue-related medical errors to determine whether fatigue is significantly contributing to the number of medical errors. Finally, we explore possible processes that might be employed to reduce or eliminate fatigue-related medical errors.

### **01.02.04 Country Institutional Distance and Franchise System Performance**

**Jayne,Rivas** *University of Central Oklahoma*

Drawing insights from neo-institutional theory, the present study suggests institutional distance is related to franchise system performance in international setting. I advance the argument that the partnership between an international franchise system and a franchisee in a host country is constrained by the level of differences in the environment. Each country shows specific institutional characteristics that build a distance -geographic, regulative, economic, normative, political, and cognitive- between franchise system and franchisee, and influence the final performance of the system. Using factor analysis, I identify the main factors of institutional distance. Following, I applied a correlation analysis to test the hypotheses. The results suggest that the dimensions of institutional distance are related to franchise system performance. The relationship between institutional distance and franchise performance is more important between partners when the level investment is low (<50K) and high (>101 K), the franchise system have few years of operation (< 39 years), and the franchise operate in the services and retail industry.

### **01.02.05 An Investigation of the Declining U.S. Natural Gas Imports**

**Kyle,Cevera** *University of Central Oklahoma*

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

It is evident that the natural gas imports of the U.S. have been declining in recent years. Several demand and supply factors may be behind the decline in the imports. The proliferating production appears to be the main driving force behind the imports decline. In addition, staggering demand due to efficiency improvement and more or less normal weather in more recent years could be contributing to it as well. In our study, we examine several aspects of gas import declines. Specifically, we study the patterns of the gas imports in more recent years with respect to the sources of imports such as pipeline imports and LNG imports. In addition, we study the connections between the declining patterns in imports and the increases in the production pattern. The trend in consumption pattern and its connection with imports will also be investigated. The data will be based on the information from the U.S. Energy Information Administration. Empirical analysis based on this data will be expected to provide some stylized facts about the gas imports, as well as some information about the factors behind the decline in imports. Our study hopefully will provide some insight into the future of the gas import and export business.

## **01.02.06 Transportation Outsourcing: A Qualitative Study**

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

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

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

Existing research depicts an increasing trend across different industries toward outsourcing logistics-related activities. The decision to outsource transportation or keep it in-house is widely acknowledged to be at the top of that list. While the consensus is building around the importance of the cost component related to the outsourcing decision, other factors should not be overlooked. The purpose of the current research is, first, to systematize the various factors affecting the transportation decision and second, to investigate the extent to which “soft” factors (other than cost) contribute to the decision-making process. Initial insights from trade publications and personal experiences from industry experts further supported the overarching research question driving the study - how important are emotions in business overall and particularly in outsourcing compared to the related tangible considerations. Qualitative research methodology was used to develop an assessment tool or a frame of reference to help evaluate the transportation outsourcing decision. In-depth interviews served as the primary method to gain a better understanding regarding the role of emotions and cost considerations in the transportation outsourcing decision. The results supported the initial notion that together with a detailed cognitive assessment of the transporter capabilities, the outsourcing decision involves a considerable emotional component.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

### **01. Business Administration**

### **03. Economics**

#### **01.03.01 What Motivate the Merger and Acquisition Activities in the U.S. Oil and Gas Upstream Sector?**

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

**Zachary, Perkins** *University of Central Oklahoma*

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

The U.S. oil and gas industry (O&G) has experienced a tremendous amount of growth in the last decade or so due to the development of horizontal drilling technology. In the meantime, the industry experienced heavy merger and acquisition (M&A) activities from time to time, especially in the upstream sectors. While these M&A activities may be related to the aggregate M&A waves in the country, they are unique in their own respect. We recognize that the M&A activities in the energy industry in general, oil and gas in particular, can be different from the traditional sense of the M&A activities. In this paper, we provide some stylized facts on the M&A patterns in the O&G upstream sectors, focusing on the factors that influenced these patterns. Our empirical evidence suggests that among the variables we studied, oil price, O&G production, and sometimes, capital market liquidity conditions played large roles in shaping up the M&A activities. In addition, the M&A activities had momentums built in, which is consistent with the wave pattern. Our findings support the notion that industry specific factors are more important in determining the M&A in O&G industry.

### **01.03.02 Colleges Retention Rate: A Survey and Further Findings**

**Devin,Usher** *University of Central Oklahoma*

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

College retention has been among the most important topics in higher education institutions across the country. The student retention affects students, educators, higher education institutes and thus the well-being of a nation's economy as a whole. Although the college retention is a continuously evolving topic, it has been a topic of interest for researchers since early 1970s, resulting in many published articles focusing on numerous factors affecting the retention rate. The purpose of this study is to identify the common factors affecting the retention rate among available studies and identify new factors to further enhance the literature. Some of the more common factors of interest are: Community Involvement, Demographic, ACT scores, Academic Performance, Social Support and Ethnicity. Examples of less attended factors affecting retention rate in the literature are:Financial Stability Impact, Personal factors,Type of Student and Unexpected factors(any factor that cannot be realistically captured). This study consists of a quantitative analysis, with the help of recent parametric methods, which could help to identify (and isolate) the possible effect of these factors on the retention rate using available UCO data.

### **01.03.03 Stop.....,Don't Drop: Student Retention Rate**

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

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

Student retention has been one of the most talked about issue in post-secondary educational institutions. Recent statistics from universities suggest that the problem persists, and in some cases has worsened in the recent years. Among studies, most investigate factors affecting retention rate either by major and course or at the aggregate college/university level.Until recently, most opinions were merely speculation without any empirical evidence. However, in the last few years, the need for evidenced based studies has been recognized by researchers resulting in published empirical studies. This study attempts to extent the literature by employing up to date empirical models (parametric and non-parametric) with the retention rate as the variable in question (dependent variable). The explanatory variables, i.e., factors affecting student retention, such as personal factors, demographic factors, academic performance, financial stability impact, community involvement, social support, among others, are of interest. In addition we intend to use the surveyed results, once administered to various UCO students, to obtain a better grasp on what factors affects the student retention rates. The hope is that the results of this study help administrators and faculty to better understand factors related to student retention and, for example, engage students in activities/projects beyond the the classroom in an attempt to retain the existing students.

#### **01.03.04 OPEC vs Oil Price Changes: The Oil Cartels Attempt to Control the Market**

**Abdul,Meizan** *University of Central Oklahoma*

**Megan,Dement** *University of Central Oklahoma*

**Tanner,Hodges** *University of Central Oklahoma*

Our research topic focuses on the price decisions of OPEC and their effects on oil prices. We will first gather the historical data and information of OPEC's price decisions from the last thirty five years. Then we will showcase an analysis of the historical information. This will include categorizing the pricing decisions, determining the reasoning and contributing factors behind OPEC's decisions, comparing OPEC's desired outcome to the realistic outcome of these decisions, and exactly how and to what extent these pricing decisions affected oil prices.

#### **01.03.05 Economic differences between Germany and US: how does it affect the use of different types of energy.**

**Ingrid,Vieira** *University of Central Oklahoma*

**Michael,Patrick** *University of Central Oklahoma*

Germany was, in 2012, the largest energy consumer in Europe and the eighth largest energy consumer in the world. US is the largest energy consumer in the world. However, Germany and U.S.'s uses of alternative energies are quite different as Germany is the number one country in usage of alternative energies and US is the seventh. Accordingly to EIA, 11% of all the energy used in Germany comes from renewable resources, while US has only 2.7% of energy coming from renewable sources of energy. We intend to research on the energy policies in both countries to understand the use of alternative energies. We also intend to study other factors that may or may not influence energy sectors of each country, which include environmental agency policies, countries current energy reserves, public opinions, and also the country's energy production and consumption. Our study is expected to help us to better understand the policies behind the energy mix and future directions in each country's energy development and consumption.



### **01.03.06 Helping Students Learn Through Analogies and Examples in Business Statistics Course**

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

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

**Mariya,Burdina** *University of Central Oklahoma*

**Neil,Metz** *University of Central Oklahoma*

**Nela,Mrchkovska** *University of Central Oklahoma*

The project is aimed at helping students learn principles of business statistics by providing experiences that actively involve students in the learning process. According to the generative theory of learning, people learn better when they can relate new material to their prior experiences. We propose to improve student learning outcomes by assigning students to generate analogies or examples that relate to students' personal experiences when learning business statistics concepts. In order to investigate whether or not student-generated analogies and examples improve the learning process, we conduct an experiment in which one group of students is assigned to generate the analogies and examples and the other group of students is assigned to review analogies generated by instructor or other students. We further compare the exam scores of students in each of these groups. The participants of the poster session will be introduced to the analogies as an assessment tool, learn about its benefits and possible downsides, and learn practical strategies for using analogies in the evaluation of student knowledge. Preliminary results of the project should reveal if there are significant differences in students' learning outcomes between two groups.

### **01.03.07 Country Comparisons of Proven Energy Reserve Utilization**

**Andrew,Rutter** *University of Central Oklahoma*

**Christopher,Leon** *University of Central Oklahoma*

**Johnathan,Gray** *University of Central Oklahoma*

Most countries are sitting on some type of energy reserve big or small, whether it is natural gas, oil, or coal. When looking at the top reserves in the world one would expect those same countries to also be in the top producing, exporting, and maybe consumption. Questions arise when one country owns the world's largest reserves and produces only a fraction compared to that of another country who owns a smaller reserve. We noticed that this is the case when researching about proven global reserves and left with some questions which we would like to find the answers to. Our intention is to show who owns the largest energy reserves (not just oil) and compare it with their respective production, export, import, and consumption levels. With those comparisons we can pin point which country is utilizing their reserves efficiently. The countries who seem to not, we would like to find an adequate answer as to why that is. Hopefully our research will lead us to more questions and cause us to dig deeper into how each country uses their reserves and why.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **04. Finance**

##### **01.04.01 Correlation Analysis of Nine Major Stock Indices: An Empirical Study**

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

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

**Josh,Hollinshead** *East Central University*

**Yifei,Ma** *East Central University*

This study empirically examines the magnitude and directions of linear correlation among nine major stock price indices selected from three continental regions throughout the global financial crisis around 2008 and during the ensuing economic recovery. The indices are Dow Jones, NASDAQ Composite, and S&P 500 in the United States; DAX, FISE 100, and CAC 40 in Europe; and Hang Seng Index, Nikkei 225, and SSE Composite in East Asia. Two time periods, August 2007 - February 2009 and February 2009 - May 2014, are considered in our study. We aim at determining how the stock indices in the same and different regions in the world correlate over time. The sample correlation coefficients are computed and then a two-tailed t-test is conducted for each pair of the nice indices. Our findings, as shown by the line charts of the price indices, the matrix of their correlation coefficients and the outcomes of the two-tailed t-test, indicate that the U.S., European, and Asian stock indices considered in the study exhibit significantly positive correlations throughout the financial crisis, while SSE Composite Index has significant negative correlation with six of the other stock indices during the economic recovery. The results of this empirical study shed some light on the dynamic complexity of the global stock markets and offer managerial implications for investment decision in those markets.

## **01.04.02 The Impact of Sarbanes-Oxley Act on Independence and Compensation of Corporate Board of Directors**

**Gaurango, Banerjee** *LINDENWOOD UNIVERSITY*

**Halil, Kaya** *Northeastern State University*

**OBJECTIVE** We look at possible effects of the Sarbanes-Oxley (SOX) Act (2002) on board independence and director compensation of US companies during the period 2001-2006.

**HYPOTHESIS** We expect U.S. corporations to become more independent after the Sarbanes-Oxley Act passed. **METHODOLOGY** We use Wilcoxon tests to compare the percentage of outside directors before and after the Act. Then, we do similar comparisons for our four compensation variables.

**RESULTS** We find that U.S. corporations had significantly more outside directors after the Sarbanes-Oxley Act passed (i.e. in the 2003-2006 period) when compared to 2001. We observe a short-term, positive impact on equity-based compensation for directors between 2001 (pre-SOX) and 2003-2004 periods (post-SOX). On the other hand, we observe a reversal of equity-based compensation after 2004 to pre-SOX levels, implying that the effects of SOX on incentive compatible board compensation were temporary and short-lived. We conclude that policymakers must increase long-run monitoring of such Acts to ensure adherence to the corporate accountability guidelines and recommendations of the Act over time.

## **01.04.03 Do Business Conditions Affect High-Leverage and Low-Leverage Trade Firms Equally?**

**Halil, Kaya** *Northeastern State University*

**OBJECTIVE** We examine the impact of business conditions on high-leverage and low-leverage U.S. trade firms' profitability and liquidity measures during the 2000-2005 period. **HYPOTHESIS** We expect high-leverage trade firms to be more sensitive to changes in business conditions. **METHODOLOGY** We use Wilcoxon tests for our comparisons. **RESULTS** High-leverage retailers are more sensitive to changes in business conditions. On the other hand, wholesalers' leverage levels do not alter how their profitability values are affected by business conditions. Therefore, for wholesalers, there is no "leverage" effect on profitability. In terms of liquidity, I find that leverage is an important factor for wholesalers, but not for retailers. While favorable business conditions affect high-leverage wholesalers' liquidity values positively, the impact on low-leverage wholesalers' liquidity values is negative.

#### **01.04.04 Optimal Retirement Asset Allocation for RUSO Employees**

*Chad,Cormell Southeastern Oklahoma State University*

*Guillermo,Haugen Southeastern Oklahoma State University*

*Han-Sheng,Chen Southeastern Oklahoma State University*

*Larry,Prather Southeastern Oklahoma State University*

*Ying-Chou,Lin Southeastern Oklahoma State University*

RUSO employees are afforded the opportunity to invest for their retirement through the use of a 403b. A 403b is a tax deferred or tax sheltered account that is permitted under current tax law and permits compounding returns over what could be many decades. Because RUSO has decided on Voya as the 403b provider, RUSO employees face two important decisions; (1) how much to invest in the 403b, and (2) how their investment should be allocated. The first decision is a personal financial decision driven by a combination of tax law and unique personal circumstances. Finance theory can provide guidance on the second decision of how assets should be allocated. The purpose of this research is to investigate the historical risk and return of the Voya investments that are offered to RUSO employees and to use Markowitz (1952) optimization, which won him a Nobel Prize in 1991, to form optimal risky portfolios. Next, because RUSO employees will have differing risk attitudes about their acceptable level of risk, we will form utility maximizing portfolios for RUSO employees with differing levels of risk tolerance.

#### **01.04.05 Analysis of house prices in Dallas, Texas**

*Aastha,Aryal Cameron University*

*Arif,Qayyum Cameron University*

*Omer,Rehman Cameron University*

The purpose of this paper is to analyze the prices of houses in Dallas, Texas and observe the relation between house price and its 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 Determinants of house prices in Oklahoma City**

*Arif,Qayyum Cameron University*

*Rahul,Bisht Cameron University*

The purpose of this paper is to analyze that how much sales price of houses in Oklahoma City depends on different characteristics of these 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.

#### **01.04.07 Can a student manage Bond portfolio beat national indices?**

**Arif,Qayyum** *Cameron University*

**Ehenedon,Toniâ€™Osagie** *Cameron University*

**John,Williams** *Cameron University*

**Roger,Bannon** *Cameron University*

**Thierno,Diallo** *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.

#### **01.04.08 Analysis of the Effects of the 2008 Financial Crisis on Banks: Regional and national**

**Ehenedon,Toniâ€™Osagie** *Cameron University*

**Roger,Bannon** *Cameron University*

**Thierno,Diallo** *Cameron University*

The purpose of this research is to look at national banks versus regional banks (Oklahoma and Texas) during the 2008 financial crisis. We will attempt to determine whether differences in size and level of risk between large and small institutions have any financial effect during the 2008 financial crisis. We examine six institutional annual financial reports over the course of several years. Our results show level of risk and profitability of both types of banks under stressful macroeconomic conditions.

#### **01.04.09 Surviving the Crisis: American vs. Foreign Automakers**

**Aastha,Aryal** *Cameron University*

**Ann,Morris** *Cameron University*

**Arif,Qayyum** *Cameron University*

**Jack,Hughes** *Cameron University*

**Rahul,Bisht** *Cameron University*

The objective is to analyze if the foreign car manufacturers fared better than domestic car manufacturers during the 2008 recession within the United States auto market. We examine the financial data and business policies of the top three domestic and top two foreign auto manufacturers to determine how each reacted to the financial crisis during the period leading up to and immediately following the 2008 financial crisis. Our findings indicate whether it is foreign or domestic auto manufactures that is less affected by the financial crisis.

#### **01.04.10 Designing a Course on Capital Budgeting: Opportunities, Challenges and Pitfalls**

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

Capital budgeting decisions are among the most important part of a finance manager's responsibilities. This paper describes the author's attempt at designing and teaching a new course on capital budgeting. The project afforded the author a degree of freedom not to be found in the more common courses that are offered every semester and taught by many of his colleagues. The course presented very interesting opportunities and challenges because of the needed expansion of coverage of topics that the students have already been exposed to and inclusion of new topics that are relevant. An early decision was made not to use a specific textbook, primarily because the available textbooks seemed old and did not quite fit the author's conceptual framework for the course. The author planned detailed notes as handouts that would be distributed through the course web page. The finance textbook coverage of capital budgeting tended to be heavy on concepts and light on the details needed for successful investment decisions. The author attempted to correct this perceived imbalance. The author's experience of working as a project engineer in a large industrial firm came in handy in this regard. The major pitfalls in a course like this include a potential overreach and attempting to do more than what can be done well within the confines of a one-semester course. One should be also be careful not to overload the students and exceed their capabilities.

## **01.04.11 Cameron University Stock Portfolio: An Analysis**

**Aastha,Aryal** *Cameron University*

**Ann,Morris** *Cameron University*

**Arif,Qayyum** *Cameron University*

**Jack,Hughes** *Cameron University*

**Rahul,Bisht** *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.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

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

##### **01.05.01 Comparison of Website Creation Platforms: Weebly.com and Wix.com**

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

Trying to decide which website builder is better for you? This poster presentation will compare and contrast two popular website creation platforms – Weebly.com and Wix.com. More specifically, this project will compare 1) template designs available, 2) drag and drop structures, 3) user support, 4) steps to exporting a domain name, 5) advertising, 6) popularity, 7) tools, and 8) comparison of pricing. Hopefully, this project will help you decide overall whether Wix or Weebly is the better website creation platform for your needs.

##### **01.05.02 The Benefits of Excel Visual Basic for Applications to the Small Business Owner**

**Brent, Jay** *University of Central Oklahoma*

**David, Noel** *University of Central Oklahoma*

VBA (Visual Basic for Applications) is a feature included within Microsoft Word, Outlook, Excel, Access, PowerPoint, and Publisher which can be used to enhance all components of the Office product. The purpose of this research project is to show small business owners how they can implement and use Excel VBA within their company to enhance their business processes. Small businesses can create a wizard style user interface with the use of VBA for those dreadful tasks that have to be completed each day by an employee using excel. A benefit of using a wizard style feature to input data into excel is that one can limit the number of possible errors by adding drop down boxes, combo boxes, buttons, etc... Small businesses can also purchase previously created add-ins that are written in Excel VBA. These add-ins provide the small business with the benefits of VBA without having to have someone within the company create it for them. After reading this paper, the small business owner(s) will have an understanding of VBA and the myriad of practical benefits it provides. They will know that users can create custom interfaces that are used in conjunction with macros and custom build functions to build entire applications. With this knowledge the small business owner can implement the features within VBA to their business processes.



### **01.05.03 Small Business Guidelines for Disaster Recovery in the Cloud**

**Dao,Ha** *University of Central Oklahoma*

**Michelle,Hepner** *University of Central Oklahoma*

Data loss is the most common business disaster for large and small companies. Data loss can occur due to hardware failure, human error, theft, or natural disaster. A system and data backup plan must be followed to avoid catastrophic consequences to any disaster or failure. Utilizing a cloud backup solution can provide convenient, fast, and reliable online storage for backups but only if the cloud services provider is well-chosen and the recovery plan is well defined. This research study explains how cloud services can help small businesses, discusses common misunderstandings about cloud services, and aims to help small businesses plan their system and data backups as well as their recovery of systems and/or data. This study also includes studying end-user licensing agreements (EULAs) for common cloud services being used today, and interviews with numerous small businesses to assess their knowledge and understanding of cloud services. In addition, cloud service providers in Oklahoma were interviewed to assess when local providers may offer greater benefits than common national or international cloud services provide. Finally, this study also tested system and data backup to a cloud service provider in order to create guidelines for small businesses. These guidelines will help businesses select the best cloud services provider for their disaster recovery plans and guide their expectations regarding cloud performance and reliability.

### **01.05.04 Learning Styles: Determining their effects in Programming Classes**

**Misael,Serna** *University of Central Oklahoma*

The purpose of this research is to analyze differences in performance due to the learning styles of students in beginning programming classes. We will analyze lecture-based programming courses and hands-on programming courses. We will administer a survey which will include a set of programming problems. We will then analyze the results by comparing the student's performance and the students learning styles. As a result we can gain a more complete understanding of the effect of teaching methodology and learning styles on performance. To collect my data I will select 4 beginning programming classes from the University of Central Oklahoma. Two of these classes will be taught using hands-on experience and the other two through lecture methods. Data will be gathered from participants by handing out surveys which will contain a set of demographic data and programming problems. We will be answering these research questions. To what degree does the teaching methodology affect student performance? To what degree does the learning style affect student performance? The first research question will be answered through a t-test with teaching methodology as the independent variable and student performance as the dependent variable. The second research question will also be answered through a t-test, with learning style preference as the independent variable and student performance. Correlations between dependent measures will be examined.

### **01.05.05 Guidelines for Small Businesses: How to Select a Cloud Service Provider**

**Sajana,Shrestha** *University of Central Oklahoma*

With increasing publicity and hype for Cloud Computing, there is increasing demand for a wide range of Cloud services. Thus, the number and variety of Cloud services and service providers are abundant. This has created plenty of confusion for small business owners who lack information system expertise but must sift through the huge pool of cloud vendors and their services. To help owner's determine what provider and service is right for their small business, this research provides guidelines for selecting the best cloud solution in terms of reliability, affordability and security for their business. As a part of this research, various small businesses were interviewed in order to understand their knowledge as well as their perception of Cloud service and providers. Similarly, various cloud service providers in Oklahoma as well as online were analyzed according to important business criteria for small businesses such as ease-of-use, encryption, and ownership of cloud data. These guidelines will help the small business community to comprehend essential elements when agreeing to a Service Level or Licensing Agreement with any cloud provider.

### **01.05.06 Making Products Scarce The Right Way: The Moderating Effect Of The Source Of Scarcity And Brand Identity On Consumers' Valuation**

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

**Thanh,Tran** *University of Central Oklahoma*

This project explores how scarcity enhances consumers' perceived value for the product. There are two hypotheses: the first investigates the moderating effect of the type of scarcity (i.e., which is created by limiting the quantity vs. distribution of the product) on the perceived value. The second hypothesis study the moderating effect of the type of brand (i.e., popular vs. private brands) on the perceived value. The finding provides important implications for marketers in designing effective promotion strategies by using scarcity.

### **01.05.07 Security Program Development: The importance of information sharing within the critical infrastructure.**

**Martin,McCurdy** *Oklahoma State University - Institute of Technology*

The U.S. Department of Homeland Security has emphasized a significant need for protecting our nation's critical infrastructure from cyber-attacks. Until recently, cyber-threats against critical infrastructure were perceived as being constructed by nation-state attacks. Now, cyber-attacks have progressed into individuals or groups causing havoc to the private sector's critical infrastructure. The development of an organization's security program based on information sharing will provide the private sector with an increased awareness. These concepts focus on acquiring context about a threat, assess policies and remediate standardized procedures, and bridge gaps through collaboration among an organization's departments. This analysis will display the various methods that occur in a security program and how these processes are utilized to validate their compliance and fulfill the security scope.

## **01.05.08 IS Security Strategy When Using the Cloud for Small Businesses**

**Mohamed,Al Moutaa** *University of Central Oklahoma*

IS security is an essential part of small businesses. Using cloud computing for data storage and backup might be the best approach for businesses in Oklahoma. Small businesses have a big impact in the U.S. economy, consisting of approximately 50% of the working population. They are three fundamental models that cloud computing providers offer: infrastructure as service, platform as a service, and software as service. Also, there are three main delivery models: the private cloud where the business has exclusive use of an isolated cloud, the public cloud which is a shared-service environment accessible to any customer, and hybrid cloud which combine the public and the private cloud. It is important for small businesses to be aware of the security aspect of using cloud computing and have an IS strategy when using it. Small businesses have become easy targets for cyber attackers due to their lackadaisical protections. Ninety per cent of small and medium sized businesses in the U.S. do not use data protection for company and customer information and fewer than half secured their company email to prevent phishing scams. There are more than just phishing scams that challenge their security. There is also malware, wireless internet vulnerabilities, online fraud, compromised websites, spear phishing, unauthorized access, and cloud computing risks. The purpose of this research project is to determine the security aspect that small business face and to explore security rec

## **01.05.09 Design reflection in action for novice conceptual modeling**

**I-Lin,Huang** *Langston University*

**Judy,Hsu** *Creative Process Research Lab*

Conceptual modeling is a major part of information system development process. During information system development process, systems analysts often analyze users' requirements represented in textual descriptions. Then the systems analysts transform their understanding of the users' requirements into conceptual models. Conceptual modeling introduces the system analysts to a language game that transforms the representation of a given set of information system requirements by natural language into those by the conceptual modeling language. The differences between the two languages have made conceptual modeling a difficult task, especially for novice systems analysts. As a result, conceptual modeling is well-known as an error-prone process. When studying the differences of novice and expert analysts in conceptual modeling, reflection in action is an important skill used by expert analysts to attain deeper understanding of the modeling situation and step out of unproductive blockages. In order to improve novices' modeling performance, this research proposed a scaffolding environment for novices to reflect on their modeling process and hence they will have opportunities to detect and solve their misconceptions. In this research, we identified the opportunities for novice analysts to reflect, self-question, or self-explanation during conceptual modeling, which will then results in better quality of conceptual models

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **06. Management**

##### **01.06.01 College Retention: A Widespread Problem and Possible Solutions**

**Cuong, Doan** *University of Central Oklahoma*

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

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

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

After their first year in college, multiple students decide to drop out, and living in this economy without a college degree will not be easy. There are different reasons students leave college. Some of these reasons include: lack of financial resources/assistance; loss of focus; not feeling like “a part” of the community; lack of a good educational foundation; lack of knowledge about “how to be a college student”; and lack of a family/friend support structure. What can universities do to improve retention? The authors have found various activities that impact retention. Some of these include: regular communication or interaction between a student and his or her professor or mentor; research opportunities with faculty; student tutoring; experiential, service, and transformative learning opportunities; addressing various learning styles; activities to make students feel welcome (e.g., orientation, first year experience, student welcome week, etc.); discipline-specific clubs; general education and discipline-specific advisement; special student services (e.g., first-generation; disability support services; Veteran student support, etc.); scholarships; and career counseling.

## **01.06.02 Animals on Campus**

**Clarence, Von Bergen** *Southeastern Oklahoma State University*

**Emily, Robinson** *Southeastern Oklahoma State University*

**Martin, Bressler** *Southeastern Oklahoma State University*

**Sarah, Roberts** *Southeastern Oklahoma State University*

For decades, universities have been accommodating physically disabled students who require guide dogs and other types of service animals. Within the past several years, however, mentally disabled students have increasingly petitioned colleges with “no pet” policies to permit them to bring their animals on campus because they need a companion or emotional support animal to make college life easier and to reduce their stress, loneliness, depression, and/or anxiety. Institutions that unlawfully reject such requests are finding themselves in court and charged with disability discrimination. Schools are understandably confused about their obligation, if any, to waive their pet bans under these circumstances. This article discusses pets on campus and provides administrators guidance with respect to this increasingly contentious issue and to keep their organizations “out of the legal dog house.”

## **01.06.03 Student Opinions Regarding Global Sustainable Business Practices: A Comparative Study Between the United States of America and the Kingdom of Saudi Arabia**

**Darron, Arnold** *University of Central Oklahoma*

Newly enriched countries are currently developing at rapid rates due to extreme wealth. This rapid growth means that there is no better time to utilize sustainable development that has otherwise proven to be prohibitively expensive in already developed countries when retrofitted to existing incompatible infrastructures. Through studying the attitudes of future decision makers, one can assess their level of preparedness and willingness to integrate sustainable technologies into their business plans, school curricula, and structures. Our hypothesis being that university level students and institutes for higher education are not sufficiently cognitive of sustainable development and what it really means: we developed a survey using commonly accepted attitude studies concerning sustainability. The New Environmental Paradigm study, for example, is used to predict future support of respondents toward environmental preservation. We hope to discover the level of awareness and willingness of college students and educators to acknowledge the need for long term planning in business and to recognize that shareholders are not the only stakeholders in a business. Proper sustainable development planning should consider outcomes or affects not only to the firm, but to suppliers, buyers, employees, supporting communities and neighbors as well.

#### **01.06.04 When Running Second Wins the Race: Examining the Benefits of Second-mover Advantage**

**Martin,Bressler** *Southeastern Oklahoma State University*

Skilled managers are expected to be able to make quick decisions. In fact, highly-valued managers are often those who operate at high-speed in all their work. In business managers perceived as showing initiative, taking charge, and getting things done are esteemed. Unfortunately, many managers sometimes get so caught up in the fast pace of business that they do not take the time to pause, reflect, and to consider “the big picture.” The authors propose that managers take time to reflect and think creatively in order to develop a more systematic approach to planning. Although waiting might be frowned upon by some, waiting does not have to be disparaged. In fact, waiting actively may allow a second-mover, or close follower, additional time to examine and analyze the competitive situation and select the ideal time to make appropriate strategic moves. In this paper, the authors examine the benefits of being a second-mover and offer that as a strategic choice.

#### **01.06.05 Adoption of Virtualization and its Business Impact**

**Ankur,Nandedkar** *Cameron University*

**Jayant,Chaudhary** *Cameron University*

**Rahul,Bisht** *Cameron University*

Businesses are investing heavily on technological enhancements and one of the emerging technology that has garnered the attention of scholars and practitioners alike is virtualization. The purpose of this paper is to highlight the effectiveness of virtualization. We demonstrate it by explaining the way businesses can embrace this technology to significantly reduce their operating expenses. Overarching goal of virtualization is to eliminate inefficiencies in resource utilization, and enhance profitability for the business. In order to shed light on the efficacy of virtualization, various business specific case studies provided by virtualization vendor companies like Cisco, VMware, and Tech target were considered. Additionally, the financial statistics provided by these studies were also used to ascertain the facts presented in the paper. A thorough understanding of the virtualization and how it can help business improve the overall performance is a necessity before implementation of the technology. This paper intends to help managers understand what virtualization is and how the businesses can embrace this technology to enhance their overall performance. The limitation of this paper is that it only focuses on server virtualization and does not go in depth about other virtualizations techniques like storage virtualization and desktop virtualization. It was done for the parsimony of the research.

## **01.06.06 Follower Reactions to Dark Leadership**

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

**Paige,Dodson** *University of Central Oklahoma*

Research regarding the 'Dark Triad' has increased in popularity over the past decade. This study investigates the relationship between follower's emotional intelligence and the desire for managers to portray dark leadership traits with a focus on psychopathy. Data will be collected using Qualtrics from university students, from the College of Business at a mid sized metropolitan university. Emotional intelligence will be measured using Wong's Emotion Intelligence Scale, and the desire of leaders having psychopathic traits will be measured by the Hare-P Scan developed by Robert D. Hare and Hugues F. Hervé. Participants will start by taking the emotional intelligence survey, which will determine if their level of emotional intelligence is high or low. In addition, participants will complete a survey that asks them to rate their desire for managers to have certain psychopathic traits based on a 1 to 5 scale. Currently, data is being collected and analyzed to provide evidence on the relationship between follower's emotional intelligence and the desire for their managers to possess psychopathic leadership traits.

## **01.06.07 The Implications of a Code of Ethics in the Workplace**

**Alicia,Johnson** *University of Central Oklahoma*

The purpose of this research is to gain an understanding of how a code of ethics coupled with reflection effects ethical decision-making, ethical awareness, concern for stakeholders, and method of upward influence. In the present study, we aim to examine the impact of an organization's code of ethics, in conjunction with guided participant reflection, on ethical decision-making. Participants will choose to attempt to influence an employee. We hypothesize that participants given a code of ethics will choose the more ethical decision after reading the scenarios. Participants will read background information, which will explain the company's financial standing, stakeholders, community impact information for the organization, and individuals in the scenario. Participants will then be presented (or not presented) with the organizational code of ethics. After reading and reviewing the code, participants will be given ethical dilemmas. In addition, participants will be asked to consider the situation and determine a course of action by writing an email response that aims to influence their manager. After the presentation of the dilemma, participants in the reflection condition will be asked specifically to generate 5-7 positive impacts and 5-7 negative consequences of their course of action for internal and external stakeholders. Data is currently being collected and analyzed to provide evidence of the importance of the hypotheses, the code of ethics in the workplace.

## **01.06.08 Recruitment Strategies Used by Hiring Professionals**

**Johnna,Newby** *Cameron University*

**Krystal,Brue** *Cameron University*

The Bureau of Labor Statistics projects more than 1.3 million college graduates will enter the workforce in 2015, giving rise to the question, "What strategies are used by hiring professionals when recruiting and assessing new talent?" In an effort to determine prevailing strategies, researchers polled 27 human resource (HR) managers to garner information. The mixed methodology survey asked managers (a) to rank desired applicant skills and recruitment methods and (b) to provide qualitative data including successful applicant traits, common mistakes on applications/resumes, interviewing pitfalls, and difficult interview questions. Researchers hypothesized most hiring managers would rate job-related skills highest and would prefer online resources to recruit new talent. These assumptions were substantiated as 10 of 27 HR managers ranked job-related skills as the most important quality applicants possess. Furthermore, the survey indicated that 16 of 27 HR managers most often use online resources to recruit new applicants, followed closely by networking with other professionals as their second choice. Surveyed managers indicated that applicants who showed honesty, productive traits, and relational skills were of high demand. Issues regarding the job search process included false information, aesthetic issues, a lack of knowledge/information, and egotism. Behavioral, situational, personal inquiry, and skill/knowledge based questions were favored during interviews

## **01.06.09 DATA MINING AND ITS APPLICATIONS IN INDUSTRIES**

**Ankur,Nandedkar** *Cameron University*

**Funke,Ajisafe** *Cameron University*

Technology plays an important role in enhancing business effectiveness. The primary purpose of the paper is to shed light on data mining technology and its utility for the business. In this paper, the literature on data mining techniques was reviewed using different journals, articles and books. This manuscript gives a clearer understanding of the basic techniques used, data mining models and also explains the benefits and drawbacks of data mining. The main objective of data mining in businesses is to improve decision making. It helps businesses to predict potential outcomes, understand their customers better and to have a competitive advantage. It has a lot of benefits and it has helped organizations to collect, analyze and access data in new ways. For data mining to be effective and relevant in businesses, managers or business owners must have a better understanding of how it works and how to it can be applied to their day to day activities. This paper intends to help managers to understand the fundamentals of data mining and how it can be applied.



## **01.06.10 An evolutionary theory of Industry and Firm Dynamics: A Demand-side Analysis**

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

We provide a demand-side perspective on the structural determinants of firm heterogeneity along an industry's life-cycle. Our theoretical framework, which includes both industrial and firm dynamics, features a dynamic demand environment that provides the structural context for firms' temporally heterogeneous strategic choices. Demand-side competence is conceptualized as a mediating firm-specific construct to explain the endogenous relationship between the dynamic structural characteristics of the demand environment and firms' path dependent demand-side investments. Our alternate demand-side explanation of temporally heterogeneous firm behavior focuses on three distinct facets of evolution of firm heterogeneity – entry heterogeneity, investment heterogeneity, and exit heterogeneity – along the evolutionary path of an industry. Notably, the empirical predictions generated by the stylized theoretical model are not only novel but also directly conflict with the results of competing models of the endogenous relationship among industry and firm dynamics.

## **01.06.11 Distracted Driving Survey**

**Katy,Ellis** *Northeastern State University*

**Kelsey,Perrin** *Northeastern State University*

**Michael,Turner** *Northeastern State University*

**Taylor,Melone** *Northeastern State University*

Distracted Driving Survey Northeastern State University Tahlequah Student Chapter of the American Society of Safety Engineers The Northeastern State University Tahlequah Student Chapter of the American Society of Safety Engineers (ASSE) has produced a survey to measure attitudes and behaviors of faculty, staff and students at all universities within Oklahoma. This research follows a survey that was conducted in 2009 by the same student organization. Since 2009, most states have established various laws, regulations and penalties associated with cell phone usage while driving. Additionally, myriad forms of media are used to inform drivers of the dangers associated with cell phone use while driving. Some of the main goals of this survey are to determine the effectiveness of these laws, regulations, and penalties as well as the media messages in terms of altering driver's attitudes and behavior. The electronic survey will be conducted using Checkbox and will be emailed to all faculty, staff and students at every university in Oklahoma.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **07. Marketing**

##### **01.07.01 Marketing Sports & Diversity Simultaneously: Exploring the Presence of Corporate Spin in Recent Diversity Sports Franchise Scandals**

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

**Taylor,Dickerson** *University of Central Oklahoma*

Recent scandals involving public scrutiny of executives in sports franchises have culminated in the need to better understand diversity issues in sports franchises. A recent franchise response has been the practice of hiring a Chief Diversity Officer. Whether the franchise truly needed a Chief Diversity Officer or whether the new hire was only the result of "marketing" diversity to clean up a mess is up for debate. This research shares an overview of the specific cases (e.g., Atlanta Hawks GM, LA Clippers owner, etc.) of inappropriate actions by executives or corporate officers associated with sports franchises and examines public perception, media coverage, and organizational responses. Findings, based on information gathered, will probe the presence of corporate spin and offer insight on when and why sports franchises might hire Chief Diversity Officers or choose to diversify ownership, management, and/or coaching staffs.

##### **01.07.02 The Influence of Persuasive Message Appeals on Asian Consumers**

**Angelia,Barrera-Medina** *University of Central Oklahoma*

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

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

**Oon Feng,Lim** *University of Central Oklahoma*

Persuasive promotional appeals have long been incorporated into marketing messages. Using a 4 x 2 factorial design with 300 participants, this research examines the effectiveness of persuasive promotional appeals on Asian consumers and various message media on consumer perceptions and purchase intentions. Understanding the persuasive impact of promotional appeals on Asian consumers extends marketing and persuasion literature and improves the implementation of marketing strategy.

### **01.07.03 The Effectiveness of Promotional Mix Strategy on Asian Consumers**

**Angelia,Barrera-Medina** *University of Central Oklahoma*

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

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

**Oon Feng,Lim** *University of Central Oklahoma*

In marketing, numerous channels are used to execute promotional strategy with little regard for differences in cultural groups. Using a 4 x 2 factorial design with 300 participants, this research examines the effectiveness of different types of promotional media two particular types of cultural consumers – U.S. American and Asians. Understanding the most effective promotional mix channel, can enhance a firm's use of marketing strategies and allow marketers to better tailor promotional efforts to Asian consumers.

### **01.07.04 Exploring the Persuasive Impact of CSR Campaigns on Mothers**

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

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

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

**Sarah,Neese** *University of Central Oklahoma*

In corporate social responsibility (CSR) campaigns, social and environmental concerns are incorporated into company practices to benefit the company or the company's products. Using a 3 x 3 factorial design with 360 participants, this research examines the effectiveness of CSR campaigns and various message media on mothers' perceptions and purchase intentions. Understanding the persuasive impact of CSR campaigns on mothers extends marketing and persuasion literature among this demographic and improves the implementation of marketing strategy.

### **01.07.05 Exploring the Persuasive Impact of Stealth Marketing Campaigns on Mothers' Parenting**

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

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

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

**Sarah, Neese** *University of Central Oklahoma*

Stealth marketing campaigns involve front group activities where third-parties send messages on behalf of companies in order to benefit the company or the company's products. Using a 4 x 4 factorial design with 360 participants, this research examines the effectiveness of stealth marketing campaigns and various media on mothers' perceptions and purchase intentions. Understanding the impact of stealth campaigns on consumers, specifically mothers, can provide insight on how best to thwart under-handed stealth activity in order to protect consumers and safeguard organizations.

### **01.07.06 Mothers' Perceptions of Stealth Marketing Campaign Effects on Their Own and Other Children**

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

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

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

**Sarah, Neese** *University of Central Oklahoma*

Stealth marketing campaigns are alternative forms of marketing where third party messages are sent on behalf of companies in order to benefit the company or its products. Using a 4 x 4 factorial design with 360 participants, this research examines mothers' third-person perceptions on their own and other's children. Understanding the persuasive impact of stealth campaigns on consumers, specifically mothers, as well as third person effects extends marketing and persuasion literature and improves the implementation of marketing strategy.

### **01.07.07 Framing “Fracking:” The News Media’s Coverage of the Controversial Issue of Hydraulic Fracturing.**

**Melissa, Graham** *University of Central Oklahoma*

**Sarah, Landers** *University of Central Oklahoma*

It seems like everyone has an opinion on “fracking”, the nick name created for the process used by oil and natural gas companies technically termed Hydraulic Fracturing. Hydraulic fracturing, which was first introduced in 1947 and mixed with horizontal drilling in the 1980’s, is a process by which Oil and Natural Gas companies extract shale gas from deep within sedimentary rock by pumping water mixed with sand and chemicals into the rock through an L shaped borehole(Everley, 2014). The water puts enough pressure on the rock to fracture it, allowing the natural gas to escape. After the fracturing process is complete the untreated waste water is injected into deep disposal wells. This research uses framing and agenda setting theories to investigate how the news media cover the controversial issue of hydraulic fracturing. Understanding how this issue is communicated by the news media could assist in understanding the media’s influence on public participation and opinion. To analyze frames associated with the issue of hydraulic fracturing, qualitative thematic analysis was used to identify dominant frames found in newspapers in Oklahoma, a state known to have a multitude of companies that practice hydraulic fracturing. Since the media play a role in shaping public opinion, the results from this study will be of particular interest to oil and gas companies who desire an accurate picture of the process and the environment and health concerns associate

### **01.07.08 Decomposing the Total Impact of Multiple Stimuli in an AD from the Perspective of Classical Conditioning**

**ahram, hwang** *University of Central Oklahoma*

**Kanghyun, Yoon** *University of Central Oklahoma*

For the design of advertising campaigns, marketers are using classical conditioning theory to create an association between unconditioned and conditioned stimuli. However, the reality is that a set of marketing stimuli—instead of using one stimulus—is used for the pairing purpose. Given that, the goal of this study is to show how to identify the net impact of each stimulus on conditional response using the conjoint approach. Our findings help marketers design effective advertisings.

### **01.07.09 A New Roadmap for Sustainable Value Chain from the Value Creation Perspective**

**Kanghyun, Yoon** *University of Central Oklahoma*

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

Managing value or supply chain is an important task for firms since it governs the process of passing products to customers to serve their unmet needs. Considering two emerging concepts of sustainability and value creation process, the goal of this project is to propose a conceptual framework for sustainable value chain management (VCM) from the value creation perspective. Our guidelines focus

on encouraging customer engagement into the value creation process during the value chain management.

### **01.07.10 No Cash - Just "Kohl's Cash": Are In-store Vouchers More Effective than Mail-in Rebates?**

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

**Thanh,Tran** *University of Central Oklahoma*

Companies rely on a variety of marketing tools to attract and retain customers. Recently, the use of in-store vouchers (e.g., Kohl's Cash, CVS's Extra Bucks)—instead of mail-in rebates—is on the rise. This project compares the effectiveness as well as profitability of in-store vouchers to that of mail-in rebates by investigating (1) consumer's perceived attractiveness of in-store vouchers, and (2) the firms' trade-offs between the benefits and costs of using in-store vouchers.

### **01.07.11 Is the Company's Social Media Usage Related to its Financial Performance?**

**Manoshi,Samaraweera** *University of Central Oklahoma*

**Zihao,Wang** *University of Central Oklahoma*

Many companies are increasingly using social media platforms such as Twitter, Facebook and LinkedIn, however, whether the use of these outlets actually improves the performance of the company is a question that lacks empirical evidence. In this study, we monitor the social media activity of a sample of 82 large public companies, on the aforementioned three social media platforms, over several quarters, to ascertain whether social media usage is related to the financial performance of the company. We also examine which social media outlet(s) have (does not have) a significant effect. We use Hierarchical Linear Modeling to analyze the data. Results will be presented at the research day.

### **01.07.12 Quantifying the Impact of Top Sales Executive's LinkedIn Connections on the Financial Performance of the Company.**

**Faria,Badhan** *University of Central Oklahoma*

**Manoshi,Samaraweera** *University of Central Oklahoma*

This study empirically tests whether the number of LinkedIn connections of sales executives is related to the financial performance of the company. First, we monitor the LinkedIn connections of a sample of sales executives working for a set of large public companies over several quarters. We then assess whether the LinkedIn numbers are related to the company's quarterly financial metrics (such as ROA and ROI). Given the nested structure in the dataset, we use Hierarchical Linear Modeling to analyze the data. Results will be presented at the research day.

## **01.07.13 Minority Ownership of Oklahoma-based Home Healthcare Organizations**

**GENNICE, WILLIS** *University of Central Oklahoma*

Minority Ownership of Oklahoma-based Home Healthcare Organizations The purpose of this study is to explore the challenges of the low percentage rate of minority-owned home healthcare providers in Oklahoma. The focus of minority-owned business patterns are influenced by economics, politics and social decisions. This project revealed barriers for business start-up prospects that impact the rate of success. Business start-ups face challenges of lack of capital resources including savings, loans from family members, and/or financial institutions. Policies and regulations by politicians, and the influence of lobbying efforts from established organizations can limit competition. Decisions based on social influences can have a detrimental impact on the success of small businesses. Local and national data were studied to address the causes and influences that contribute to the low rate of minority businesses and the inability for many to thrive. Shortage of capital injection and business insight negatively influence the ability for growth. Results and outcomes for minority businesses are analyzed with the use of collectible data.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

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

#### **01. Education**

##### **02.01.01 Americans with Disabilities Act and the Hospitality Management Programs**

**Elizabeth,Reeve** *Other Institution*

**Renee,Cambiano** *Northeastern State University*

When looking at the desires of the many hospitality management programs, many state that they will prepare the students to become qualified hospitality professionals for the various opportunities available in the fastest growing segments of the nation's economy (Milwaukee Area Technical College, 2014). Part of becoming prepared is understanding the many issues related to the field, such as the many allegations due to not being in compliance with the Americans with disabilities act (US Department of Justice Civil Rights Division, 2014). There are methods to train adults in different environments, such as the Malcolm Knowles' theory of andragogy, just-in-time learning theory, and adult education theory by Mezirow and Brookfield (Wang & Kania-Gosche, 2011). However, it is unknown rather higher education students in the hospitality programs are being trained to use these resources, in regards to the ADA, or being assessed for the use of these programs (Šerić, Saura, & Descals, 2011). Adult education theories state that the adult needs to feel empowered and in-control of their learning (Coryell, 2013; Franz, 2007). The qualitative, transformative study will explore how the training and assessment allows the students to feel empowered when applying the ADA in the hospitality industry.



### **02.01.02 Physiological Reactivity is Negatively Correlated with Implicit Racist Attitudes**

**Caleb,Lack** *University of Central Oklahoma*

**Deon,Hall** *University of Central Oklahoma*

**Justin,Durham** *University of Central Oklahoma*

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

The project investigated the degree to which an individual's implicit racist attitudes influence the level of anxiety achieved while watching video clips of socially inappropriate humor. There is a growing need for research as it relates to multiculturalism. In this study, participants had their heartrate and galvanic skin response recorded while being shown videos, two of different types of humor (socially inappropriate and slapstick) and one control clip of an innocuous political story. The participants were also instructed to complete a racial Implicit Association Test (IAT). The race of experimenter was manipulated as half the participants were instructed by a black experimenter and the other half were instructed by a white experimenter. It was hypothesized that participants who scored significantly on the IAT would experience the least amount of anxiety in the presence of a black experimenter while viewing the socially inappropriate clip. There was a negative relationship between implicit racism and anxiety. Individuals who scored high in implicit racist attitudes were generally less anxious while watching the humorous clips.

### **02.01.03 Student Perceptions on Teacher Caring**

**Kathryn,Brown** *Northeastern State University*

Caring behaviors are crucial for student achievement (Garza, 2010). This research seeks to examine how students perceive caring based on the following behaviors displayed by an instructor: good classroom management skills, academic support, interpersonal relationships, and a sense of trust and respect. This study investigated the differences in perceptions of 30 freshman honor students at a Midwestern United States regional university. This quantitative study utilized a Likert-type 22 item survey to examine and explore the perceptions of teacher caring held by said students. Significant differences were found in all areas: Classroom Management, Academic Support, Interpersonal Relationships, and Respect and Trust.

#### **02.01.04 Food Safety Knowledge among Undergraduate College Students: A Questionnaire-based Survey**

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

**Shaina, George** *University of Central Oklahoma*

The purpose of this study is to assess food safety knowledge of various undergraduate students on the University of Central Oklahoma campus. Each student was given a 10-question survey that included an assortment of questions about food safety. After the survey was taken, students were given an answer sheet that gave a detailed explanation of each question. There were also educational handouts for each student who took the survey. Food safety education is an important topic that needs to be educated to all sexes, ages, and majors. The findings concluded that females, Caucasians, mid twenties, and nutrition majors are more educated about this topic. A need for relevant and motivating food safety education exists in other groups.

#### **02.01.05 Implementing 21st Century Skills Using Technology in the K-12 Classroom**

**Anna Talkington, Talkington** *East Central University*

This research is directed toward exploring how effectively 21st Century Skills or ISTE "Students Skills", as defined by the ISTE (International Society for Technology in Education), are being incorporated into classroom curriculum, lesson-planning, and teaching real world application of the skills. Our study examines three main research questions: Which 21st Century Skills are being implemented? What is the technology self-efficacy level of practicing teachers? What specific technological tools are being used? Part of this project was developing a survey using Google Docs. The link to the survey was sent out via e-mail to cooperating educators who are currently working or have worked in conjunction with the East Central University Department of Education Office of Field Experiences and Student Teaching. The results of our survey suggested that the ISTE global and financial literacy student skills are possibly the skills being implemented least. Technologies that were commonly used were Smart Boards, Computers/ Laptops, iPads/tablets. Additionally, teachers struggled most with solving hardware/software issues, using productivity tools, and using media to collaborate.

#### **02.01.06 Impact Behaviors of First-time and Developmental Students**

**Erik, Wilkinson** *Northeastern State University*

**Kristal, Soderstrom** *Northeastern State University*

As many in Higher Education already know, first to second year retention rates are a major issue on many campuses across the nation. This is often because first year students have to navigate a myriad of issues that can impact their retention from year one to two. However, first generation students and those needing remediation face an even higher risk of not being retained after the first year. Using data obtained from the MAP-Works Early Alert system through surveys taken by first year students during their University Strategies course, this study looked at five out-of-classroom factors that could impact the retention of these students; social media usage, study hours, campus involvement, on/off campus living, and choosing a major. The presenters will discuss some of the interventions taken by staff at the Student Academic Success Center at Northeastern State University to address these issues with students, and the success the program has had in helping retain these students.

## **02.01.07 Effects of Personal Experiences, Victim/Perpetrator Appearance and Myth Acceptance on Perceptions of Sexual Assault**

**Brittany,Riggin** *University of Central Oklahoma*

**Lorry,Youll** *University of Central Oklahoma*

**Melissa,Baker** *University of Central Oklahoma*

**Thomas,Hancock** *University of Central Oklahoma*

Sexual violence perpetrated against women continues to plague women in the U.S. and around the world. The purpose of this research is to combine previous studies regarding victim blaming, rape myth acceptance and victim/perpetrator empathy in a more comprehensive way by examining the effects of rape myth acceptance as well as perpetrator and victim appearance on likability, believability, guilt, and empathy ratings for both the male perpetrator of sexual assault and the female victim. It is hypothesized that victim and perpetrator appearance, degree of rape myth acceptance, empathy felt toward perpetrators and victims of sexual assault, unacknowledged rape perpetrator/victim status and endorsement of ambivalent sexism will have a significant relationship with regard to an individual's tendency toward victim blaming. Results from this comprehensive study will make it possible to draw clearer conclusions of mediators in perceptions of rape cases.

## **02.01.08 Tracking Unconscious Eye Movements Toward the Blind Spot**

**Yasmin,Shirali** *University of Central Oklahoma*

**Objectives** My study is focused on finding out where a person's gaze is directed when using monocular vision. It is also my objective to find out if these eye movements are unconscious. If they are, I will examine the costs and benefits using an evolutionary approach. **Hypotheses** My hypothesis is that when using monocular vision, a person's initial gaze will go to the vicinity of his blind spot when looking at a still picture. I also hypothesize that when using monocular vision, a person will most frequently look in the vicinity of his blind spot when looking at moving stimuli. **Methodology** I will test 30 volunteers who will be recruited using SONA. The 30 participants will serve in the test condition and the control condition. I will use the Blind Spot Experiment from the USD Internet Psychology Psychology Laboratory to locate their blind spot. I will then use the SMI Eye-tracking system to show participants the stimuli and record their visual movements. **Summary** I expect that participants will make unconscious movements toward their blind spots. Having a deeper understanding of how the blind spot affects monocular vision will have many applications, especially in the medical field.

## **02.01.09 The Effects of Pre-Kindergarten Literacy Skills on First Grade Reading Comprehension**

**Christy, Gammon** *University of Central Oklahoma*

**Julie, Collins** *University of Central Oklahoma*

The goal of this study was to examine whether an intervention of additional instructional time attending a public pre-kindergarten program provides a benefit of improved reading proficiency in first grade. With the number of children struggling to read on grade level in third grade, a focus has developed for early intervention. This study examined whether there is a connection between attending pre-kindergarten and improved reading skills in first grade. Children who have poor letter knowledge, phonological awareness and language skills at the beginning of kindergarten have a difficult time learning to read, and as such it was predicted that those children will also have a difficult time comprehending grade level passages in first grade. Children who attend pre-kindergarten often know more letters, more letter-sound associations and have a stronger proficiency in understanding and using the English language; and as such it was further predicted that children who have strong letter knowledge, phonological awareness and language skills will be capable of comprehending grade level passages in first grade. Data collected for this study included reading assessment data from pre-kindergarten, kindergarten and first grade for students currently in first grade. Data was analyzed for students in groups by those who attended pre-kindergarten and those who did not. Data collection and analysis are ongoing. The researchers will share the current status of the data analysis.

## **02.01.10 Preparing Teachers for Urban Schools: Preliminary Findings from an Urban Teacher Preparation Academy**

**Amanda, Coker** *University of Central Oklahoma*

**Candace, Cunningham** *University of Central Oklahoma*

**Joshua, Putnam** *University of Central Oklahoma*

**Lauren, Belflower** *University of Central Oklahoma*

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

**Pamela, Bollig** *University of Central Oklahoma*

**Yetundi, Quadri** *University of Central Oklahoma*

The purpose of this study was to investigate the effectiveness of an Urban Teacher Preparation Academy (UTPA) in retaining and developing effective teachers. The program studied was developed through a collaborative partnership between the University of Central Oklahoma (UCO) and Oklahoma City Public Schools (OKCPS), an urban school district, in response to a shortage of qualified teachers in the Oklahoma City metropolitan area. Data sources included classroom observations conducted by the research team and observations conducted by UCO supervisors. Data were coded with the analysis focused on identifying patterns in three domains; instructional practice, classroom management, and classroom environment. Particularly noteworthy were the positive teacher-student interactions and classroom climates, and the use of pedagogical practices that support active learning. Relatively few instances were observed of individualized instruction and relating instruction to the experiences of urban students. Seventy-four percent of the academy graduates have accepted employment with the (OKCPS) and at this time all remain in the district. The program shows promise in producing effective teachers that choose to remain in urban schools.

## **02.01.11 Re-Thinking the Purpose and Practice of Research at Masters Level Institutions: A Case Study**

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

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

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

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

**Olivia,Curtis** *University of Central Oklahoma*

Introduction: Our purpose is to investigate what capstone experiences for graduate students are most beneficial in accomplishing students' career goals; concentrating on readiness to enter the workforce or furthering students' education into a PhD program. Methods: Audio recorded interviews will be conducted with Program Coordinators from Master's programs in the spring semester of 2015. Information obtained from the Program Coordinators will assist in answering some of the following questions: What are the structure and goals established in your current capstone experience? What are the current student learning objectives for graduate students? What are the opportunities that graduate students encounter after graduation, workforce or PhD, other? What is the perceived "readiness" of each graduate student for their next opportunity? Results: Since data gathering will start spring semester of 2015, results has not yet been acquired to report. Conclusion: While we expect that most capstone experiences are adequately preparing students for their future endeavors, we hypothesize that alternative capstone experiences may further enhance graduate student preparation. Further research will include investigating new and alternative capstone experiences, implementation of those new and/or alternating elements, and broadening our sample to a wider variety of universities.

## **02.01.12 Passive Speakers in the Absentee Shawnee Community: Understanding their Silence**

**Donna,Longhorn** *University of Central Oklahoma*

Passive Speakers in the Absentee Shawnee Community: Understanding their Silence The Absentee Shawnee language is among the many severely endangered languages still spoken in North American and Canada (Krauss, 1998). As fluent Native American language speakers pass away, the urgency to uncover resources for language preservation increases. Passive speakers are the adult members of indigenous communities who understand their heritage languages fluently but rarely, if ever, speak them (Grinevald and Bert 2011). This research study explored the impact traditional Absentee Shawnee socialization practices had on restricting the operational use of the Shawnee language in adulthood. Absentee Shawnee tribal members with a certified degree blood quantum of  $\frac{1}{4}$  -  $\frac{3}{4}$  between 55 – 75+ years of age were surveyed. The survey included societal/cultural (i.e., boarding school era), language socialization (i.e., language shift) and emotional variables (i.e., affective filters) that may contribute in developing passive speakers. Preliminary analysis of data from 50 participants will be shared and discussed at this poster session. Results point to the importance of Tribal and scholarly attention that is directed towards understanding the passive speaker phenomena in order to determine what language revitalization potential lies within these tribal members.

### **02.01.13 Relationship Between Envy and Psychopathy**

**Kiersten,Durning** *University of Central Oklahoma*

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

Several aspects of envy and psychopathy share a negative emotional holding on the individuals and their actions, the direction of the current research is to measure and see the relationship between both of these emotions in the same individual. Often individuals who experience high levels of either of these emotions will turn hostile. The expectation is that individuals will show a positive correlation with both emotions. Thus, those who measure highly in one of these emotions will also measure highly in the other.

### **02.01.14 Electromyography of Microexpressions and Mimicry in Relationship to Psychopathy**

**Kiersten,Durning** *University of Central Oklahoma*

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

This research is directed toward a better understanding of emotions being shown through Micro-Expressions, comparing an individual's ability to "hide" their emotions comparing low and high psychopathy participants. Measuring the participants' facial movements in reaction to the picture both when inhibiting emotion and not. Micro-expressions may be socially determined with an individual mimicking another's emotional facial expression. This study will test if pictures displaying facial expressions would be causation for more muscle movement, measured with electromyography.

### **02.01.15 Understanding the Difference: A Look at Higher Education From the Voices of American Indian Students**

**Corey,Still** *Northeastern State University*

The spectrum of the American Indian identity is a complex structure that encompasses many aspects of one's life. This is true too for the identity of the American Indian students who attend higher educational institutes across the country. This study identifies and examines the difference in experiences and issues encountered at a higher education institution by American Indian undergraduate college students with a strong cultural/tribal identity and American Indian students with a hereditary identity. The study sheds perspective over the unique identity spectrum that American Indian student presents and provide recommendations to improve American Indian student services.

## **02.01.16 Positive Effects of Studying Foreign Languages on Academic Performance**

**Maria Laura,Lopez Gonzales** *Cameron University*

Currently, the United States' education system places little emphasis on teaching foreign languages compared to the emphasis placed on other areas such as math, science, and art. To be both competitive and competent in our current job market, students graduating from secondary and post-secondary schools must have the necessary tools to be able to face the challenges that ongoing globalization brings. A study at Cameron University was created to determine the relationship between the formal and informal study of foreign languages and general academic performance. As part of the study, a survey was given to students at Cameron University who responded to questions concerning languages learned during their primary, secondary and post-secondary school education, as well as their current letter grades and GPA scores at the college level. The study showed that there is a positive correlation between studying foreign languages to various degrees and academic performance.

## **02.01.17 A Preliminary Investigation of the Effectiveness of Interactive Whiteboard Technology in an Early Intervention Classroom**

**Daiquirie,Crumrine** *University of Oklahoma*

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

Numerous scholarly articles and anecdotal reports describe the uses of the interactive whiteboard (IWB) in educational settings. To date, few studies using experimental designs exist, and no studies were found investigating the effectiveness of this technology for children with communication disorders. As a first step in the investigation of IWB effectiveness, the purpose of the proposed research project was to use a single subject design to compare children's on-task behavior during instruction using an IWB with on-task behavior during traditional instruction in which an IWB was not used. It was hypothesized that young children with and without communication disorders would demonstrate increased on-task behavior when curriculum was delivered using an IWB. On-task behavior was defined as a child oriented towards, or looking at, the instructor or the IWB. If the instructor had directed the child to look at an object, picture, or another child, on-task behavior included the child following the instructor's direction. In general, children demonstrated slightly better on-task behavior in response to instruction delivered via an IWB. However, unique cognitive profiles and learning styles were noted and should be taken into consideration when choosing instructional methods.

## **02.01.18 Assessing Overall Satisfaction of American Indian Students with the NSU Experience**

**Jennifer,McCann** *Northeastern State University*

**Tom,Jackson** *Northeastern State University*

Northeastern State University's Indigenous Scholar Development Center (ISDC) is a Title III NASNTI grant designed to identify and facilitate the success of at-risk American Indian students. In order to provide the necessary services the ISDC assesses American Indian students' overall levels of satisfaction and familiarity with NSU and its Indigenous services and programs. Familiarity with support and programs were also assessed. The survey consists of five demographic questions and 19 satisfaction program familiarity questions. The Checkbox software used allowed for only self-identified American Indian students to receive the survey link as well as limiting their completion of the survey to one iteration. In order to increase the response rate, ISDC gained IRB approval to distribute and collect the survey in a paper format from American Indian students. Results indicate positive satisfaction overall and some of the services provided as well as a degree of familiarity with NSU indigenous services and programs which, while acceptable, needs further promotion. Discussion will include the survey results as well as steps to be taken to heighten awareness, familiarity and satisfaction with all of NSU's indigenous programs.

## **02.01.19 Challenges That Saudi Students Face in Higher Education in the United States**

**Rachel,Hurt** *Southwestern Oklahoma State University*

**Safa,Alshareef** *Southwestern Oklahoma State University*

One important service provided by the government of Saudi Arabia to the citizens is education for all age groups. Education is free for all genders regardless of education level. Saudi opened many public and private universities in the country to accommodate all of the students. One of the educational opportunities provided to students are scholarships to study outside of the country. In 2007 only 10 thousand students were studying in the United States. By 2014 the number had risen to 111 thousand. Eighty-eight of those students are studying at Southwestern Oklahoma State University in Weatherford, Oklahoma. Coming to the United States to receive an education is rewarding. However, it can be difficult. What challenges do Saudi students face in the United States?

## **02.01.20 The Educational Advantages of the High-Throughput Computing Installation Process**

**Bradley,Paynter** *University of Central Oklahoma*

**Evan,Lemley** *University of Central Oklahoma*

There are many researchers across the country working at primarily teaching universities. These researchers usually have limited access to high-performance computing (HPC) resources. In these cases, high-throughput computing (HTC) solutions such as HTCondor are attractive as they require significantly less infrastructure cost. Unfortunately, time and money for research are also in scarce supply at such institutions. We discuss the advantages of leveraging a resource that is plentiful, undergraduate students, to install and configure an HTC cluster.



## **02.01.21 The Resilience of Women who Were Sexually Abused as Children**

**Martine,Basden** *Northeastern State University*

The purpose of this research is to examine factors that lead to resiliency in women who were once abused sexually as children. Studies show that 1 in 4 women were sexually abused before the age of 18. Researchers have documented that 20% to 44% of adults who were sexually abused during their childhood show no apparent signs of negative outcome (Centers for Disease Control and Prevention, 2006). Some women have overcome their sexual abuse from childhood through social support and disclosing the abuse as well as other factors that lead to resiliency.

## **02.01.22 Factors Affecting Student Loan Debt at a Mid-Sized Four-Year University**

**Kari,Hurt** *Northeastern State University*

**Sophia,Sweeney** *Northeastern State University*

The student loan default rate in the United States is at an all-time high. Defaulted student loans can have long-term negative impacts on the borrower and the university. The purpose of the study was to determine the risk factors of the sample for defaulting on their student loans and to determine the relationship between the students' anticipated earnings after graduation and their student loan debt. A researcher-developed survey was used to collect data from undergraduate and graduate students at a mid-sized, regional, four-year university in the mid-western United States. The results revealed that the students at this university have the following characteristics of borrowers who are more likely to default on their student loans: married (48%), with dependents (60%), 21% of respondents are between the ages of 23 and 27, and first generation college students (56%). A two-tailed dependent t-test was revealed non-significant differences between students' estimated earnings after graduation and Oklahoma's average earnings for the same job. A Pearson product-moment correlation revealed a non-significant weak positive correlation between students' estimated earning potential and the student loan debt incurred. The results of this research may help financial aid officers help students make informed choices about their student loan debt.

## **02.01.24 Evaluating the Impact of Healthy Vending Machines at the University of Central Oklahoma**

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

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

Due to the growing obesity epidemic in Oklahoma, college students need to be aware of what they choose as food options in order to help prevent weight gain and all of the negative implications associated with it. The availability of vending machines on the campus of the University of Central Oklahoma is very present, but the machines with healthy snack options are limited. Last year, the Healthy Campus Initiative resulted in two healthy machines being placed in two separate buildings on campus. The purpose of this project is to discover the difference in nutrient densities between snacks in the traditional versus healthy vending machines. Snacks in both types of vending machines were examined for fat, calories, sugar, sodium, and fiber. Results showed that all but one of the snacks in the health machine are considered reduced calorie items, but that the overwhelming majority of those in the traditional machine are not reduced calorie items. By analyzing the nutrients in the typical vending machine's snack and drink options and comparing them to the snacks and drinks in the healthy vending machines, it should be evident that the health benefits associated with the standard snacks and drinks will be lesser than the healthier options.

## **02.01.25 The Nontraditional Female Student: Identifying Needs for Academic Support**

**Shannon,Altom-Deckard** *Northeastern State University*

Nontraditional female students continue to make an appearance in growing numbers on college campuses, enticing researchers to take a closer look at how this changes the dynamics of a traditional education. This study of 151 nontraditional female students researches support needs in the areas of financial support, childcare needs, counseling services, and additional student services desired. Additionally, the study demonstrates an interest in peer support networks to aid in the social support of the nontraditional female student. Recommendations are made to conduct further research in identifying the special needs of the nontraditional female student, as well as consideration given to orientation programs and technology training specifically structured to meet the educational needs of a nontraditional female student population.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

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

#### **02. Family Science**

##### **02.02.01 Is the Health Care Bill Healthy for Physical Therapy?**

**Rachel,Payne** *University of Central Oklahoma*

With a new national health care system in place, many industries in the medical field will experience rapid and unexpected changes. These changes that occur in one sector will also have an impact on others, making it important to be aware of the evolution. This paper focuses specifically on the field of physical therapy, a crucial service of rehabilitation, pain management, preventative care, and maintaining overall health. This paper will show how supply and demand for the industry will be affected, breaking down factors that will contribute to the increases and decreases in the supply and demand for the market. These factors include everything from new regulations placed directly on physical therapy to the indirect affects of other industries changing. Through critical analysis of the past trends in the physical therapy business and the new Affordable Care Act, this paper will discuss the future of physical therapy in a new and changing health care environment.

##### **02.02.02 Exploring the Dialectics in African American Female Perceptions of Healthy Foods**

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

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

Dialectics are the tensions navigated in relationships (e.g., love/hate, joy/anger). Through 30 interviews with African American females, this project explores dialectics from a racio-ethnic and gendered perspective, which has not yet been employed to discern the health perceptions of minority women. Identification of the tensions associated with African American women's perceptions of "healthy" and "unhealthy" foods will extend the contextual area of relational dialectics theory and improve health education among African American women.

### **02.02.03 Preparing Young Adults for Successful Relationships through the Within My Reach Relationship Education Program**

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

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

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

Many struggle with forming and maintaining healthy romantic relationships. The incorporation of the research-based Within My Reach (WMR) relationship education curriculum into an existing marriage course allows young adult college students, who may be contemplating important relationship decisions, the opportunity to raise awareness and learn important skills that build healthy relationships. The overall objective of this research was to assess how student attitudes change regarding healthy relationship knowledge and attitudes over the course of a semester based on core principles taught through the WMR curriculum. Our hypothesis was that those in the revised marriage course would show significant gains in key relationship areas over the semester. Results showed students in the revised classes reported significant gains in Relationship Confidence, Relationship Vision, Relationship Insight, Sliding vs. Deciding behaviors, and Listening Skills. Furthermore, the individuals who were not in a relationship showed more pronounced gains when compared with individuals who were currently in a relationship. The findings indicate the students who received the revised class have a better understanding at the end of the semester of how to not only choose a good fit for a partner, but also have gained important relationship skills such as communication and conflict resolution techniques.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

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

### **03. Health Studies**

#### **02.03.01 High School and College Student Engagement: A Threshold for Exploring Opportunities Using the Labyrinth**

**Diane, Rudebock** *University of Central Oklahoma*

Labyrinth designs used as moving mediations provide unique experiences for students to become engaged in research, and labyrinths can also be utilized for service learning with the community. The University of Central Oklahoma in Edmond, Oklahoma is the first public university to install a permanent labyrinth on campus. Labyrinths can be experienced individually or with groups, and provide unique learning opportunities, whether the focus is leadership or health and wellness.

#### **02.03.02 Exploring the Effects of two Different Labyrinth Experiences in University Females**

**Kaitlyn, Burnett** *University of Central Oklahoma*

The purpose of this study was to explore the effects of two different labyrinth experiences with University of Central Oklahoma sorority students. The null hypothesis for this research study was that the two different types of labyrinth experiences would produce equivalent effects. Participants were randomly divided into either the group walking the outdoor, paved campus labyrinth, or the group experiencing the 18-inch handheld, wooden labyrinth. Each participant completed a post-questionnaire that included a Likert scale to describe how one felt after, versus before, experiencing the labyrinth. Some of the qualities assessed in the questionnaire included feeling relaxed, anxious, stressed, quiet, reflective, and more. The resulting data showed no statistically significant difference ( $\alpha=0.05$ ) between the two experiences (walking versus the finger labyrinth). Despite these findings, the data portrayed that 50% of the walking group reporting feeling "much more" peaceful after their experience, where only 25% of the finger labyrinth group reported the same. This study may contribute to academic improvements at the university level by reducing stress and providing insights to the benefits of experiencing the campus labyrinth opportunities.

### **02.03.03 Patient Knowledge of Complications, Care, and Management of Contact Lens Wear**

**Bethany,Hess** *Northeastern State University*

**Dr. Kippi,Wyatt** *Northeastern State University*

**Jaclyn,Hicks** *Northeastern State University*

ABSTRACT Purpose. To obtain a better understanding of the knowledge patients have on complications and care of contact lenses. To identify the percentage of patients at Northeastern State University Oklahoma College of Optometry, NSUOCO, who are poorly educated on contact lens management. Methods. A 10 question survey was handed out to 50 contact lens patients before the start of the exam. The results were added to find the main response to each question. A handout was made based on the questions in the survey and is now given to contact lens patients. Results. Only 28 patients think a case should be changed every three months or more often. Majority did not know that cleaning a case with spit, water, or alcohol can increase risk of complications. 56% knew that rubbing lenses does not increase complications. Seven patients said hot tubs, showering, and swimming are not safe while wearing contacts. 42% believed a complication had occurred due to contact lenses, solution, or both. Only 21 patients had received a handout before. Conclusion. Based on this anonymous survey it is apparent that contact lens patients need to be better educated on care of contact lenses. The contact lens handout will increase patients' knowledge about caring for lenses. Key Words: patients' knowledge, contact lens care and management, educational handout

### **02.03.04 A Survey of Optometric Meaningful Use Compliance in the State of Oklahoma**

**Matt,Geiger** *Northeastern State University*

Purpose. A survey of optometrists in Oklahoma, to measure their compliance with meaningful use guidelines and to determine if there were any correlations with years in practice or the electronic health record software that they were using. Methods. The study was an anonymous survey-based study, which contained four questions as well as a comments section. The survey was given to optometrists attending a continuing education meeting at the Five State Symposium in Tahlequah, OK. Results. We found "number of years practiced" to be the only statistically significant factor for non-compliance. Although more participants would have increased the reliability of our findings, we did observe a correlation between a practitioner's dislike of electronic health record system and non-compliance. Conclusion. Based on our findings, "years of practice" was confirmed statistically to have an effect on rate of compliance. Due to the broad range of electronic health records our participants used, we were unable to correlate the type of electronic health record used with rate of compliance. Key Words: Meaningful use, electronic health records, HITECH Act, practice management

### **02.03.05 Hoya's Recharge Blue-light Blocking Lens Treatment: Potential Effects on Color Vision**

*Jane, Kosin Northeastern State University*

*Thien, Nguyen Northeastern State University*

**Purpose.** This study aims to evaluate if Recharge, a blue-light blocking lens treatment by Hoya Vision Care, affects color vision. **Methods.** The subjects wore a random pair of plano glasses with either Hoya's standard anti-reflective coating or with Hoya's Recharge EX3 anti-reflective coating. After wearing the lenses for 5 minutes, the subjects performed a computerized color vision test while being timed. The color vision test involved rearranging colored plates in the order of the color spectrum. The subjects performed the test two times for each pair of spectacles for a total of four times. The subjects also completed a short printed survey at the end of the study. **Results.** Of the 30 participants recruited, 24 completed the study. There was no statistically significant difference between the Hoya's standard anti-reflective coating and Hoya's Recharge EX3 anti-reflective coating ( $P = .735$ ). There were also no statistically significant differences in the time it took to complete the 4 rows while wearing Hoya's Recharge EX3 ( $P = .205$ ). **Conclusion.** There was no significant difference in color perception and the ability to differentiate colors between the two anti-reflective lenses used in the study.

### **02.03.06 Application of Orange and Rosemary Oil Emulsions to Improve Quality and Shelf Life of Yogurt**

*Julie, Barros University of Central Oklahoma*

*Kanika, Bhargava University of Central Oklahoma*

*Matheus, Almeida University of Central Oklahoma*

*Wanderley, Sousa Junior University of Central Oklahoma*

Yogurt is well known for its health properties. Essential oils have been suggested for its vast benefits such as flavor, antioxidant and antimicrobial properties. Therefore, they can be applied to improve quality and shelf life of yogurt. However, application of these oils is limited due to their lipophilic nature. The study aimed to evaluate the effects of the use of essential oil emulsions in yogurt. The essential oil emulsions were made by ultrasonication process and characterized for particle size and stability. 2% low-fat milk was supplemented with 0.5% and 1% of orange and rosemary oil emulsions. The samples were inoculated with yogurt culture (Danisco YO-MIX 883 LYO 500 DCU), fermented (8 hours), and stored at 4 °C. Total titrable acidity (TTA), pH, viscosity and moisture content were studied. Average particle size of emulsions was 130 nm and emulsions were stable for at least 4 months. The results indicated that the application of essential oil emulsions in yogurts could be a possible alternative for a better improvement of the quality and shelf life of yogurt.

## **02.03.07 An Evaluation of the Optelec Low Vision Diagnostic Tool**

**Jedediah,Reece** *Northeastern State University*

**Purpose.** We evaluated the Optelec Low Vision Diagnostic Tool (OLVDT), a portable electronic magnification device, for its accuracy in determining add power. We also provided a survey to determine the subject's optimism in achieving their goal of reading more effectively while using the device. **Methods.** We performed an observational clinical study of 20 low vision subjects. Exclusions: BCVA of 20/40 or better, illiteracy, and significant dementia. Each subject's predicted add power for reading 1.0M text was assessed with the MNRead and the OLVDT. Subjects then rated each test on a 1-10 scale for its ability to give them more hope for improved reading ability. **Results.** The mean predicted add powers for the MNRead and the OLVDT were 7.80 and 7.29 D respectively, a difference of 0.51 D with a standard deviation of 3.59 D. The paired t-test for means was not significantly different between the two methods of add prediction ( $p=0.531$ ). The mean levels of subjective hopefulness on a 1-10 scale for the MNRead and the OLVDT were 7.75 and 8.30 respectively, a difference of 0.55 with a standard deviation of 1.905. The paired t-test for means was not significantly different between the two ( $p=0.212$ ). **Conclusion.** We found the OLVDT compared favorably with the MNRead in determining predicted add power. In our study, the OLVDT did not make subjects more hopeful about their ability to successfully read compared with the MNRead. Further research is indicated due to small sample size.

## **02.03.08 Cardiac Vagal Regulation in Complex PTSD**

**Alisa,Huskey** *University of Central Oklahoma*

**Andrew,Rutter** *University of Central Oklahoma*

**Caleb,Lack** *University of Central Oklahoma*

**Kyle,Haws** *University of Central Oklahoma*

**Yasmine,Shirali** *University of Central Oklahoma*

**Objectives** The proposed study examines potential differences between nosologically differing trauma symptomology. This investigation proposes the polyvagal theory as a comprehensive theory that examines psychological and physiological coupling, demonstrating a systemic perspective of Complex PTSD and its fundamental differences from PTSD alone. **Hypotheses** Downward trends in RSA and shorter heart periods are expected to be most pronounced in the Complex PTSD group. We anticipate a lower correlation between RSA-change and heart-period-change in the Complex PTSD versus the PTSD and control groups, indicating decreased vagal regulation. **Methodology** Clinical and control samples will be selected via diagnostic, screening, and other self-report measures on Qualtrics. Participants selected to participate will be monitored with an ECG amplifier. Subsequently, they will complete a ten minute stress-inducing math task, and then a five minute post-stress resting period. Participants will then complete the Trauma History Screen and be debriefed. **Summary** Hypothetically, observations of vagal regulation, proposed by the Polyvagal Theory will reveal differences between Complex PTSD and PTSD populations. Vagal regulation is expected to be very low or absent post laboratory-induced stress in both groups. However, during the resting period following the stressful task, individuals in the Complex PTSD are expected to exhibit less vagal brake than those in the PTSD group.



### **02.03.09 Fortification of Yogurt with Chickpea Flour Enhance Overall Quality of Yogurt**

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

**Meity, Kumalasari** *University of Central Oklahoma*

**Xi, Chen** *University of Central Oklahoma*

Yogurt is well known for its health promoting properties. Chickpea flour has been suggested to increase the growth of probiotic bacteria during yogurt production. This study aimed to evaluate the effects of raw chickpea flour on the overall quality of yogurt and anticipate inventing a new protein rich yogurt product. 2% low-fat milk was supplemented with 1%- 5% (w/v) raw chickpea flour, inoculated with a yogurt culture (Danisco YO-MIX 883 LYO 500 DCU), fermented (8 hours) and stored at 4 °C. Moisture content, total soluble solids, pH, total titratable acidity (TTA), and microbial counts were measured over a 21-day storage period. The results demonstrated that chickpea flour increased the Total Soluble Solids from 7.6 to 9.0 degree Brix. On the contrary, the moisture content slightly decreased from 88.83% to 88.08%. Additionally, overall average pH decreased (from 4.2 to 3.8) and the TTA (from 0.78% to 1.18%) increased toward the end of storage. Furthermore, the number of probiotic bacteria significantly enhanced from  $1.6 \times 10^8$  CFU /ml to  $8 \times 10^8$  CFU /ml with the addition of chickpea flour (5%, w/v) at the initial day. It even maintain the microbial counts from  $4 \times 10^8$  CFU /ml to  $3.5 \times 10^8$  CFU /ml with the concentration of 2% chickpea flour during the 21-day storage. The results indicated that milk supplementations with chickpea flour offer an alternative as a new product and provide better quality yogurt product.

### **02.03.10 Distribution of Conditions in Students Attending the Oklahoma School for the Blind**

**David, Lewerenz** *Northeastern State University*

**Kyle, Peter** *Northeastern State University*

**Phillip, Ford** *Northeastern State University*

**Introduction:** This study evaluates the distribution of causes of visual impairment in students at the Oklahoma School of the Blind. This was a unique opportunity to compare our findings with a similar study performed 26 years previously. **Methods:** Diagnoses from records of 93 students at the Oklahoma School of the Blind were acquired from a review of their medical records. A list of the most common conditions was compiled. These results were compared with other studies previously performed with special attention to a 1988 study performed at the same location. **Results:** Optic nerve hypoplasia was the most common diagnosis for subjects in our study. Retinopathy of prematurity was second most common, and was twice as prevalent as in 1988. The third most common diagnosis was cortical visual impairment, which was not reported in 1988. Students in 2014 were, on average, two years older than in the 1988 study and about 54 percent of students had best corrected visual acuity of worse than 20/200 in both studies. **Discussion:** Our finding of a significant increase in the prevalence of retinopathy of prematurity is supported by other studies. Increased survival of premature infants is likely the cause of the increased prevalence of retinopathy of prematurity. It is likely that both optic nerve hypoplasia and cortical visual impairment have increased in prevalence, but we cannot state this for certain because of the way conditions were categorized in the 1988 study.

### **02.03.11 Footstrike and Flexibility of Collegiate Cross-Country Runners**

**Evan,Fike** *University of Central Oklahoma*

Footstrike and Flexibility of College Cross-Country Runners Long distance runners and flexibility are often, without evidence, put together and people often assume that runners are flexible. The hypothesis for this study is that forefoot striking participants are more flexible in the Hip, knee, ankle and hamstring than the heel striking participants. 25 male and female runners from the Oklahoma Christian cross-country team will be recruited for this study. After recruitment the participants will sign an informed consent and then answer a demographic questionnaire. The participants will then perform a treadmill test using the F-scan Tekscan system with sensor insoles placed in their shoes while running to determine footstrike of the runners. The runners will run at four different speeds for length of one minute in each stage. Using a remote, at the 30 second mark of each stage the foot strike will record for 10 seconds to determine footstrike for that stage. Footstrike will be determined by what part of the foot strikes the ground first. After the treadmill test, the runners will perform a sit and reach test to gain their hamstring flexibility. With goniometers to assess hip joint flexibility, runners flexibility will also be tested in the knee for knee extension and flexion and ankle flexibility for dorsiflexion and plantar flexion. A 2x2 ANOVA will be performed. Independent variables for this study are footstrike and sex, and the dependent variable is flexibility.

### **02.03.12 Effect of Nintendo® Wii Fit™ Balance Games on Postural Control and Balance Among Adults with Down Syndrome**

**Michelle,Miller** *University of Central Oklahoma*

INTRODUCTION: Adults with Down syndrome may benefit from a balance training regimen. Utilizing a Nintendo Wii Fit gaming device may eliminate several barriers to exercise and promote participation in balance training. PURPOSE: This study seeks to determine if implementing a Nintendo Wii balance exercise regimen will improve postural control and balance among adults with Down syndrome over the age of 18. METHODS: Eleven adults with Down syndrome over the age of 18 years old will be randomly divided into an experimental and comparison group. The experimental group will participate in specific exercises utilizing 4-6 of the Nintendo Wii balance games and the comparison group will use up to 4 sport games on the Nintendo Wii Fit. A Tekscan HR mat will be utilized to measure center of pressure medio/lateral and anterior/posterior measurements before and after the intervention period. Balance will be measured as the time (in seconds) the participant can hold each stance. Results will be analyzed using a 2 X 2 ANOVA for each dependent variable. RESULTS: To be determined. DISCUSSION: To be determined.

### **02.03.13 Comparison of the Cirrus HD-OCT and the iVue SD-OCT Derived Cup-to-Disc Values**

**Colby,Ricks** *Northeastern State University*

**Kyle,Henderson** *Northeastern State University*

**ABSTRACT Purpose.** The main purpose of this study is to use the Cirrus HD-OCT and the iVue SD-OCT to compare and analyze the cup-to-disc values given by each instrument for the same patient at one visit. **Methods.** We recruited 48 subjects primarily from the NSUOCO optometry student population. We measured the vertical cup to disc ratio, average rim area, and average disc area of each subjects optic nerve using the Cirrus HD-OCT and the iVue SD-OCT. **Results.** According to our results, the comparison of data shows the Cirrus HD-OCT measured the vertical C/D ratio larger than the iVue SD OCT on 58% of the scans. The iVue had a greater average rim area measurement 84% of the time vs. the Cirrus. Finally, the iVue rated the average disc area of each individual larger than the Cirrus on 98% of the scans. **Conclusion.** We found a statistically significant difference when comparing the average rim area and average disc area, but no statistically significant difference when comparing the vertical C/D ratio. **Key Words:** oct, optic nerve head, cup-to-disc ratio

### **02.03.14 An Analysis of Food Options Available at and Near the University of Central Oklahoma Dania Ghassoub, Tawni Holmes PhD, RD, LD; University of Central Oklahoma**

**Dania,Ghassoub** *University of Central Oklahoma*

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

It is well known that college students have generally poor eating habits. This research aims to assess the food preferences of UCO students by use of a survey and to assess food options on or near the UCO campus. Nutritional content of foods available as well as healthy alternatives to preferred foods will be provided. Results from survey and analysis will be presented on the Oklahoma Research Day.

### **02.03.15 The Effects of High-Intensity Interval Training on Postural Control, Dynamic Balance, and Muscular Strength Among Older Adults**

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

Due to the rapid growth of older adults, it is expected that dependency and risk of disability to increase. Unfortunately, increased age is associated with increase falls. In fact, a high percentage of falls are linked to hip injuries. Hip injuries can result in immobility, decreased autonomy, physiological disruption, etc. These complications can lead to other problems far more severe. Therefore, the purpose of this study is to investigate the effects of High-Intensity Interval Training (HIIT) on postural control, dynamic balance, and lower body muscular strength; these variables have been shown to effect balance. By improving lower body strength, postural control and dynamic balance could improve. Improving these variables can reduce falls among older adults. The intervention will last 4-weeks, both groups (intervention and control group) will be assessed before and after. Participants will be active and 65 years older or older. The intervention group will complete ten different exercises targeting specific muscle groups. The exercises will be time based interval done at high intensities, respectively. The control group will continue to use their current fitness regimen throughout the intervention. Four 2X2 ANOVAs with repeated measures will be used to compare the changes in all variables. Researchers hypothesize that HIIT will produce a positive impact on all the variables and improve balance.

## **02.03.16 Susceptibility of Burkholderia cepacia Complex Isolates from Cystic Fibrosis Patients in Northeast Oklahoma**

*Jodi, Corley Saint Francis Hospital*

*Sallie, Ruskoski Northeastern State University*

*VeraLynn, Mecham Northeastern State University*

The Burkholderia cepacia complex (Bcc) is comprised of 18 distinct species which are known to be resistant to antibiotics and cause opportunistic pulmonary infections in cystic fibrosis (CF). The present study compared isolates from CF patients in northeast Oklahoma for colonial morphology, extracellular polysaccharide (EPS) expression, capsulation, and antibiotic susceptibility in order to more effectively differentiate the isolates. Yeast Extract Agar containing mannose (YEA-ms) were employed to determine sugar supplementation effects on EPS production based on colonial morphology and capsulation. Antibiotic susceptibilities were performed using automated platforms. Two B. vietnamiensis isolates cultivated on YEA-ms were slightly mucoid and 25-30% of cells were capsulated when observed microscopically while the remaining isolates were butyrous and non-capsulated after incubating 24 h at 37°C. At 48 h at 37°C, all isolates were slight to moderately mucoid on YEA-ms and all B. vietnamiensis strains exhibited 50% capsulated cells when observed microscopically. Susceptibilities were performed on 10 isolates with 7 B. multivorans isolates being 93-100% resistant, 2 isolates were 83% and 61% resistant and 1 B. vietnamiensis isolate 53% resistant to of the antibiotics tested. These data support the conclusion that most CF isolates were morphologically similar and capable of expressing EPS but not necessarily associated with cellular capsulation or antibiotic resistance.

## **02.03.17 Public Health Implications of Colombian Diaspora: Market Density as an Indicator for Food Insecurities**

*Mark, Johnson University of Central Oklahoma*

Food security is outlined as the universal capacity to procure safe food goods in a diurnal modus consistent with biological load and lifestyle. Therefore, food insecurity is the failure of these processes, which can predictably lead to anthropometric deviations, reduced educational attainment, and other deleterious public health disruptions. It is thereby crucial to reveal novel approaches in predicting food insecurities, and to elucidate subsisting mechanisms that either frustrate or fortify these conditions. Colombia is a developing country suffering from an internal conflict that has displaced over 5.2 million residents. This humanitarian crisis characteristically exacerbates established food insecurities, which reaches over 19.2 million inhabitants, > 41% of the total population. Hencetofore, no study has attempted to couple market distribution to the reported food security status of Bogotá D.C., a megalopolis of 8.7 million residents, of which, more than 5.8 million remain currently food insecure. It was then hypothesized that market density will reliably infer sustenance anxieties across the 20 localities of Bogotá. Our results revealed an orthogonal relationship between market distribution and varying levels of food insecurities throughout Bogotá, foisting poverty as a primary antecedent to hunger.

## **02.03.18 A Systematic Review of Grounded Theory Methodology and Reporting Practices in Medical Education Literature**

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

**Matthew,Holzmann** *Oral Roberts University*

Grounded theory is among the most popular qualitative methods in medicine and among the most widely cited references of qualitative research in medical education. Given its widespread usage relative to other qualitative approaches, as well as misapplication of the technique, we conducted a systematic review of three medical education journals over a ten year period. One hundred three (103) articles were retrieved that met criteria and were coded based on relevant study characteristics including constant comparison, theoretical saturation, iterative process, and theoretical sampling; we also examined evaluative criteria for qualitative studies. Results suggest that constant comparison was discussed in 62% (n=62) of the articles, theoretical sampling in 86.4% (n=89), iterative process in 51.5% (n=53), and theoretical saturation in 37.4% (n=37). We also found that many of the evaluative criteria are not adequately mentioned in our sample of studies. In conclusion, we found significant variability in the reporting of these studies. We recommend that methods sections of grounded theory manuscripts more adequately describe these important components.

## **02.03.19 Acute Effects of two Different Foam Rollers on Range of Motion**

**Isaac,Henry** *University of Central Oklahoma*

Foam rolling is based on the concept of self-myofascial release (SMR), which simply means using one's own body weight to achieve myofascial release. The popularization of foam rolling is partly due to the documented and perceived benefits of increasing ROM before physical activity such as lowering the risk of injury and maximizing the benefits of certain exercises. The purpose of this study is to compare the acute effects of two different foam rollers on hip and shoulder ROM. It is hypothesized that the denser and more versatile foam roller will more significantly increase hip and shoulder ROM. Only those who have had experience foam rolling will be allowed to participate. A randomized cross-over design will be used, with three different treatments: multi-rigid foam roller, super nova, and a control trial which will receive no treatment. Hip and shoulder ROM will be measured with a goniometer before and after each treatment by the same tester. Both foam rolling treatments are expected to improve ROM more effectively than the control, but the super nova treatment is expected to show the most favorable results. The results of this study will help clarify if foam rolling is effective at acutely increasing ROM and which foam roller is superior. Health professionals will then be able to make a better decision as to whether foam rolling should be practiced before physical activity and which foam roller will be most effective.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

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

#### **04. Nursing**

##### **02.04.01 Healthy Smile, Healthy Heart**

**Abigail, Daniel** *Northwestern Oklahoma State University*

**Corie, Kaiser** *Northwestern Oklahoma State University*

**Madison, Nichols** *Northwestern Oklahoma State University*

Endocarditis is an infection of the inner lining of the heart caused by bacteria and other germs entering from another part of the body such as the mouth. If left untreated, endocarditis can damage or destroy the heart valve and can lead to life-threatening complications. Our research suggests that untreated periodontal infections can lead to endocarditis which can possibly prove fatal. Antibiotic therapy following the initial dental procedure or after an infection has occurred has proven most effective in preventing endocarditis when taken for the full course of antibiotics prescribed. The term periodontal disease is used to describe a group of conditions that cause inflammation and destruction of the attached apparatus of the teeth. Periodontal disease is caused by bacteria found in dental plaque. This study showed that there is a relationship between dental infections and endocarditis in men who do not receive treatment with antibiotics.

## **02.04.02 Shift Work Among Nurses**

**Chelsea,Duffy** *Northwestern Oklahoma State University*

**Darcey,Kliewer** *Northwestern State University*

**Darcey,Kliewer** *Northwestern State University*

**Staci,Stewart** *Northwestern Oklahoma State University*

Nursing is a rewarding yet demanding occupation that requires dedication and personal sacrifice by the nurse on a daily basis. Long work hours and unexpected overtime can take a toll on the body and have negative effects on the health of workers. While shift work is common among nurses, it is not exclusive to this profession. Most nurses are hired for a fixed shift but there is a high possibility for schedule changes leading to shift work. Shift work is defined as shifts between the hours of 7 p.m. and 6 a.m. Monday through Friday. The high demand required during shift work puts nurses at risk for injury due to fatigue, stress and lack of consistency in scheduling. These risks contribute to dissatisfaction in the workplace along with an increase in absence from work. Suggested interventions to decrease the negative effects of shiftwork include stability of work hours, organized shifts for handover, and support from other staff members. Taking steps towards reducing complications associated with shift work will ensure that quality care is provided around the clock.

## **02.04.03 Long-Term Pharmacological Management in Adults with Acute Coronary Syndrome**

**Robin,Zornes** *Northwestern State University*

**Tiffany,Song** *Northwestern Oklahoma State University*

Dual antiplatelet therapy comprised of Aspirin and Clopidogrel has been used as a mainstay in patients with acute coronary syndromes (ACS). However, the recurrence rate of ACS events remains higher than desired, prompting interest in and research into newer medications that target thrombosis. Direct factor Xa inhibitors, orally administered anticoagulant medications, are one of the many new therapy modalities that are being investigated for widespread use. These medications directly inhibit the action of factor Xa, a major protein in the coagulation cascade. Since anticoagulants in general target a different aspect of thrombosis than antiplatelets (such as Aspirin and Clopidogrel), their incorporation into traditional dual antiplatelet therapy has gained interest. In this study, the recurrence rate of ACS events was analyzed in adults taking a daily traditional dual antiplatelet therapy consisting of Aspirin and Clopidogrel compared to adults taking a daily dual antiplatelet therapy with the addition of Rivaroxaban, a direct factor Xa inhibitor. The cohort of adult ACS patients who were administered daily doses of Rivaroxaban added to dual antiplatelet therapy were found to have decreased rates of recurring coronary events and overall mortality.

#### **02.04.04 Circulating-Water Garment in Prevention of Intraoperative Hypothermia**

**Lindsey,Nighswonger** *Northwestern Oklahoma State University*

**MacKenzie,Flowers** *Northwestern Oklahoma State University*

**Stephanie,Mast** *Northwestern Oklahoma State University*

General anesthetics impair the body's ability to achieve thermoregulation, which can result in intraoperative hypothermia. Hypothermia is defined as core body temperature that falls below 36°C. Hypothermia increases the risk of cardiac irregularities, infection, bleeding, and death. These complications may prolong recovery time and increase cost (Galvão, Liang, & Clark, 2010). The purpose of this evidence-based project is to compare the effectiveness of two warming methods in the prevention of hypothermia during the intraoperative period. Forced-air warming is currently the most used warming method during surgeries. However, due to the inability to cover adequate body surface area, hypothermia continues to remain an issue. Alternatively, circulating-water garments have been utilized as another effective warming method and in fact have been found to be superior compared to forced-air warming systems in the prevention of intraoperative hypothermia due to the system's ability to cover more body surface area (Hasegawa, Negishi, Nakagawa, & Ozaki, 2012). As well as the garments improve blood circulation by the pulsation of water through the garment, which further aids in thermoregulation (Galvão, Liang, & Clark, 2010).

#### **02.04.05 Skin-to-Skin Contact after Delivery**

**Chandra,Flynn** *Northwestern Oklahoma State University*

**Crystal,Waddell** *Northwestern State University*

**Taylor,Mathes** *Northwestern Oklahoma State University*

This poster summarizes the effects of placing the infant in skin-to-skin contact with the mothers immediately after delivery. Skin-to-skin contact after birth encompasses placing the naked infant directly on the mother's chest at, or soon after, birth. Skin-to-skin has been proven to help the newborn infant in their transition from intrauterine to extra-uterine life, including regulation of temperature, blood glucose levels, and hormone levels. Skin-to-skin contact decreases the incidence of hypoglycemia, regulates blood pressure and respirations, reduces the amount of crying, increases the bonding between the mother and infant, and promotes early breastfeeding. We show this evidence in our poster by using a case study and a model study, presenting a list of the nursing interventions, and providing supporting evidence. We also included five current, credible references that are dated from 2009 to 2014.



## **02.04.06 Nurse-Patient Ratios**

**Jermaine, Bell** *Northwestern State University*

**Loren, Quiram** *Northwestern State University*

Nurse staffing is a matter of great concern both here in the United States and abroad, because of its effects on safety and the quality of patient outcomes. The purpose of this study was to assess the correlation between patient to nurse ratios and adverse patient outcomes in a hospital setting. Nurse staffing is an extensively studied issue with results derived from nursing staff surveys and statistically analyzed data. Studies have shown that an increase in the number of nurses caring for patients has resulted in a fewer number of complications, lower morbidity rates, fewer number of medication errors, and decreased costs associated with medical care. Substantial links were found between nurse staffing and adverse patient outcomes. These links can be identified on a national and local level. In conclusion, this study indicates a need to implement safer patient to nurse ratios into nursing practice to ensure timely, efficient, and equitable patient care.

## **02.04.07 “Women and Cardiac Rehabilitation”**

**Audrey, Buss** *Northwestern State University*

**Juliana, Sismon Cooley** *Northwestern State University*

Cardiac disease is one of the highest causes of death in women. Women who have had a previous heart attack have an even higher risk of experiencing a reoccurring cardiac event. It is important to be compliant with treatment, especially Cardiac Rehabilitation, because of the effects it has on decreasing mortality rates and increasing quality of life. Although those facts are known by most of the female population, barriers such as modifiable risk factors, anxiety, depression, individualized exercise prescription and no referral or encouragement of the physician can prevent the participation in Cardiac Rehabilitation. Interventions should be implemented in order to change this scenario. This project shows that participation and awareness of nursing staff in education about the importance of treatment and about the removal of barriers plays a very important role in increasing enrollments and attendance for the twelve week program providing successful outcomes in the future. Nursing and medical staff should explain to clients the importance and the proven evidence regarding participation in a Cardiac Rehabilitation program.

## **02.04.08 Post Traumatic Stress Disorder Treatment: EMDR vs. Medications**

**Courtney, Herian** *Northwestern Oklahoma State University*

**Nayeli, Meza** *Northwestern Oklahoma State University*

The effects of first line medication and eye movement desensitization and reprocessing (EMDR) therapies, were compared in a research study of people diagnosed with post traumatic stress disorder (PTSD) over a 6-month treatment plan. Researchers selected eighty-eight random subjects and were treated with EMDR or fluoxetine. The participants received eight weeks of treatment and the outcomes were evaluated at a 6-month follow-up. EMDR consisted of 90-minute individual sessions, in which it allows the person to think about the traumatic event while focusing on eye movements. Although further research can be conducted for more evidence, researchers believe that the eye movements activate the brain's chemistry to permit changes in the person's memory structures. The outcomes were measured using the Clinician-Administered PTSD Scale (CAPS) that was proven to give reliable results in the reduction of PTSD symptoms. At a 6-month follow-up, it was concluded that the CAPS total score drop was 62.2% for EMDR and 48.3% for fluoxetine. When comparing EMDR with fluoxetine, EMDR is proven to be most effective in treating people suffering from PTSD.

## **02.04.09 Electroconvulsive Therapy**

**Carrie, Kaltenbach** *Northwestern State University*

**Katherine, Stewart** *Northwestern State University*

**Patrick, Karr** *Northwestern Oklahoma State University*

Electroconvulsive Therapy or ECT has been very controversial over the years. This is mostly due to the media portrayals of how Electroconvulsive Therapy is administered. However, despite what the majority of the public perceives, ECT is a safe and effective treatment. ECT is one of the oldest forms of treatment for major depression and mania. It is used after pharmacological treatment has failed. ECT is used continuously along with other forms of treatment for patients. ECT does have side effects such as memory loss, however, most of this memory loss is short term. It is comparable to general anesthesia after surgery. The effectiveness of ECT on the depressed, manic, and suicidal is high. The benefit of ECT outweighs the side effects of ECT in these type of patients due to the seriousness of their mental condition. If patients are given information, understand ECT, and have consented to treatment their opinions of ECT are positive.

## **02.04.10 Tai Chi in Fall Prevention**

**Benita, Coffin** *Northwestern Oklahoma State University*

Fall prevention is essential for the elderly population. With this group of people, one of the most common causes of injury is related to falls. This fact makes it a necessity to promote education and participation in activities that lessen the likelihood of impaired mobility and the consequences of losing one's balance. Tai Chi, a traditional Chinese exercise, has gained recognition in the United States among the elderly; in the areas of balance, coordination and the ability to increase flexibility. Our study involved evaluation of participants who were sixty years of age and older, in an effort to improve ambulation and reduce the risk and incident of falls. For our research, we evaluated elderly patients who were active in Tai Chi programs and others who currently live a sedentary lifestyle. In conclusion, it was found that Tai Chi did have a positive effect on reducing the risk of falls, but more extensive research would be needed to be completed in order to establish the importance of Tai Chi exercise among the elderly population.

#### **02.04.11 Pertussis Recurrence and Decreased Vaccination Rates**

**Chelsey, Tapia** *Northwestern State University*

Research has shown that numbers of Pertussis have continued to rise. Outbreaks of Pertussis have been linked to age less than six months, non-vaccination due to personal beliefs, the immunocompromised, and the older population with waning immunity. Better education for the general population by healthcare professionals will facilitate the process of decreasing the incidence of Pertussis.

#### **02.04.12 The Effects of 12 Hour Shifts on Nurses**

**Drew, Bartel** *Northwestern State University*

**Liesl, Maloy** *Northwestern State University*

**Madison, Howard** *Northwestern State University*

Twelve hour shifts are the norm for most hospitals today because it has been shown to provide improved continuity of care for the patient and increased time for the nurses to ensure proper charting in patient records. These shifts also have the potential to cause negative effects on nurses due to fatigue and the errors that may result. The objective of this study was to determine a balance point between the advantages of extended shifts and the resulting fatigue that lead to loss of productivity and accuracy. This was achieved by an examination of current peer reviewed studies that address the topic of shift work and its advantages and disadvantages. It also addresses employee surveys pertaining to appropriate interventions. The study concluded that during a 12 hour work shift, day shift nurses reported fatigue during the beginning as well as ending of their shifts. The night shift nurses reported fatigue that continued to increase as their shift progressed. Each of these shifts reported increasingly diminished amounts of sleep between each shift. The conclusion finds that while a 12 hour shift provides benefits for the hospital nurse and care of patients, it brings a rise in the effects of nurse fatigue that continually increase over multiple shifts. It also finds that three consecutive 12 hour shifts should be followed by one full day off to ensure that adequate rest can be restored.

#### **02.04.13 Perceptions of New Graduate, Post-Licensure Registered Nurses at the Initiation of Professional Responsibilities**

**Stephanie, Floyd** *University of Central Oklahoma*

The aim of this study was to identify any discrepancies between new graduate nurses' perceptions of their professional roles before they begin practice and what they experience at the initiation of their duties. Turnover and attrition is a major issue within the nursing profession. Better understanding of new graduate perceptions will provide the opportunity to identify the timeline of transition shock and be used to address the rate of turnover by better preparing new graduate nurses for practice. A case study research design was selected to survey a population of newly licensed Registered Nurses at the point just before and after initiation of professional responsibilities. Survey results were clustered thematically to look for common results among responses. Evidence was found of discrepancies between expectations and reality that indicate transition shock can be influential in nursing turnover as early as two weeks into practice.

## **02.04.14 The Effects of Folic Acid on Preterm Birth**

**Charlotte,May** *East Central University*

Preterm birth occurs before 37 completed weeks' gestation and is associated with many adverse effects for the newborn. Preterm birth prevention is a priority in public health, and the Healthy People 2020 MICH 9.1 objective is to "reduce total preterm births". Folic acid, a synthetic form of folate, is involved in multiple biological processes. Deficiency of folate during preconception and pregnancy increases the risk of fetal complications, such as neural tube defects and low birth weight. Adequate folic acid intake is also a public health priority, and the Healthy People 2020 MICH 14 objective is to "increase the proportion of women of childbearing potential with intake of at least 400 micrograms ( $\mu\text{g}$ ) of folic acid from fortified foods or dietary supplements". The purpose of this literature review was to explore the implications of adequate folic acid intake, a major component of early and adequate prenatal care, in the risk of preterm birth in the United States. The 1998 fortification of grain products with folic acid lead to an increase in serum folate levels in the United States. Interestingly, a decrease in the prevalence of preterm births occurred simultaneously, suggesting that adequate folate levels are a preventative factor to preterm birth. Nurses are in a valuable role to educate and implement nursing interventions concerning adequate folic acid intake. These activities are important and contribute to reaching the Healthy People 2

## **02.04.15 Student Learning in Simulation Based on Instructor Engagement in Design**

**Leann,Laubach** *University of Central Oklahoma*

Thesis: Simulation is a popular teaching/learning strategy to teach students in a safe environment. Faculty members who teach using simulation have the option to purchase or write scenarios, but writing scenarios can be time consuming and purchasing scenarios can be expensive. Faculty members who take the time to write scenarios may have a greater degree of engagement in the process than an instructor who uses a purchased scenario. Objective: The objective of this research was to determine if there was a difference in student learning based on instructor engagement in the design. Methodology: This mixed-methods study used multiple choice quizzes and open-ended journaling questions to elicit quantitative and qualitative responses. In a crossover design, students participated in both instructor written and purchased scenarios. Using the a priori p value of  $<.05$ , data was analyzed using a chi square analysis, t-tests and the Kruskal-Wallis test to determine differences in mean scores. A thematic analysis was conducted to find relevant qualitative themes. Summary: The results of this study indicated that both instructor written and purchased scenarios could be effective tools for teaching students using simulation. While the study indicated no significant difference between groups, learning was enhanced when students were given preparation materials and a pre-simulation orientation. Keywords: Simulation, Student Learning, Instructor Engagement, Mixed-Methods

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

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

#### **05. Physical Education**

##### **02.05.01 Traditional VS Alternative Certification: Efficacy Beliefs and Attitudes Among Pre-Service Physical Education Teacher Education Majors**

**Kay, Daigle** *Southeastern Oklahoma State University*

Alternative routes to teacher certification, existent since the 1980's, have proliferated recently as policymakers respond to the current and anticipated teacher shortage. Controversy has surrounded such alternative certification (ALT) programs, and research comparing the knowledge, teaching abilities, and attitudinal beliefs of individuals who enroll in and complete ALT programs as compared to those who follow traditional teacher education programs is mixed. This study compares physical education teaching efficacy beliefs of 583 PETE majors enrolled in traditional (TRAD) and ALT programs from 11 US universities. Data were collected via a survey using the Physical Education Teaching Efficacy Scale (PETES). Respondents were divided into categories based on program type (TRAD or ALT) and chronological stage in teacher education. Groups were compared using a MANOVA followed by ANOVAs and contrasts at specific stages. Significant differences were observed for all efficacy factors, and efficacy beliefs tended to follow two patterns. The patterns suggest that students enrolled in TRAD programs show an increase in beliefs in their abilities to engage in effective teaching practices that continues throughout teacher preparation, whereas those enrolled in ALT programs have high efficacy beliefs upon entry, but do not have the same gains, and may actually lower efficacy perceptions as they meet with the challenges of extended field-based teaching experiences.

## **02.05.02 Building a Modern Sporting Rifle (AR15): How Much Expense, Time & Skill are Needed?**

*Erika, Salmon Northeastern State University*

*Thomas, Salmon Northeastern State University*

Modern sporting rifles (AR15s) are the most popular rifles in the US. Their modular design allows customization for recreational and competitive shooting, personal defense and hunting. AR15s are patterned after the Army M16, but are incapable of automatic fire. Objective--To investigate how difficult it is to build a modern sporting rifle in terms of expense, time and mechanical skill. We assumed that building would be cheaper than buying, but it would be time consuming and difficult. Methods--Parts were purchased through local and online stores. Referring to a guidebook and online instructional videos, the principle investigator built an AR15 and recorded expenses, building time and observations. Conclusion--On the low end, the parts needed for a complete build cost about \$600. \$50-\$100 additional may be needed for tools. Comparable commercial products cost about \$700. It was surprisingly easy to build. Anyone with rudimentary mechanical skills and attention to detail can build an AR15 from a kit in about 3 hours. This is a good option for shooting sports enthusiasts who want to save money, who enjoy building and who want to understanding the inner workings of their rifle.

## **02.05.03 Do Physical Activity Levels Effect Academic Performance? Dr. Melissa Powers, Dr. Ed Cunliff and Olivia Curtis**

*Olivia, Curtis University of Central Oklahoma*

Purpose: Do students believe there is a connection with activity and grade? Methods: In the spring of 2014 the Healthy Life Skills class at the University of Central Oklahoma participated in the NCHA survey. We looked for the answers of: student class, if the student met physical activity guidelines (PAG), if the student agreed or disagreed with a connection between physical activity and performance, and GPA of their previous semester. Results: Students were more likely to be active later in their academic career and 50% of students met the PAG. There was no connection between class and agreement level; however, more than 50% of each class agreed or strongly agreed (SA). Of GPA, 75% of students who strongly disagreed (SD) with the statement had a 3.0 or below and 70% of the students above a 3.0 SA. Over 60% of the students who SA with the statement met the PAG and 60% of students who SD did not meet the guidelines. Conclusion: The majority of the students who participated in the survey do see that there is a connection between physical activity and school performance. It did not seem to matter what year the student was in their agreement level to the statement. Although, more students with a better GPA agreed with the statement it could indicate that the lower GPA students do not think about it. More of the students who met the PAG agreed with the statement, proposing that the students who are active do see a connection with their academic performance and activity levels.

## **02.05.06 The Effect of Gender and Desire of University Students on their Commitment to Lose Weight**

**James,Estes** *Northeastern State University*

**Mark,Giese** *Northeastern State University*

The Effect of Gender and Desire of University Students on Their Commitment to Lose Weight James Estes, Mark L. Giese, Richard Hoenes Northeastern State University The purpose of this study was to determine if gender or desire would have an effect on commitment to lose weight in university students. After IRB approval and securing proper informed consent from students and faculty, 148 students served as a convenient sample in this study. All 148 completed questionnaires were scanned and submitted to SPSS using a Two Way Analysis of Variance (X2 ANOVA). Question one asked for level of commitment and there was a significant difference ( $P < .001$ ) with those desiring to lose weight being more committed than those not desiring to lose weight. In question two, the number of times per week wanting to work out, there was no significant difference between males and females or those who committed/not committed to lose weight. A Chi Square for Independence was used to analyze question three. Question three asked for the best way to lose weight. There was no significant difference in the frequencies between gender and desire to lose weight. The results of this study indicate that those desiring to lose weight will be more committed, but are not necessarily willing to work out more days per week.

## **02.05.07 Using the UCLA Freshman Survey to Predict Retention Rates in University Students**

**Mark,Giese** *Northeastern State University*

Using the UCLA Freshman Survey to Predict Retention Rates In University Students Mark L. Giese Northeastern State University Colleges and Universities have been struggling with student retention issues since the development of higher education. This presentation describes an effort to use certain questions within the Freshman Survey to determine if they can predict the return of first time-full time freshman to their sophomore year. Two groups of nine questions served as predictors in a Discriminate Analysis. In the first set of questions, three questions significantly predicted the students' return the following year. In order of importance, the questions were: "do you have any concerns about your ability to finance your college education?", "do you have the following disabilities or medical conditions: Learning disability (dyslexia)?" and "have you failed to complete homework in the past year?" The second set of questions asked students to compare themselves with their peers. Two questions surfaced as significant predictors: "how they rate their academic ability" and "how they rate their self-confidence". Based upon these findings, the university may wish to look at interventions that would improve self-confidence and better identify learning disabilities

## **02.05.08 Using the UCLA Freshman Survey to Predict Retention Rates in University Students**

**Mark, Giese** *Northeastern State University*

Using the UCLA Freshman Survey to Predict Retention Rates In University Students Mark L. Giese Northeastern State University Colleges and Universities have been struggling with student retention issues since the development of higher education. This presentation describes an effort to use certain questions within the Freshman Survey to determine if they can predict the return of first time-full time freshman to their sophomore year. Two groups of nine questions served as predictors in a Discriminate Analysis. In the first set of questions, three questions significantly predicted the students' return the following year. In order of importance, the questions were: "do you have any concerns about your ability to finance your college education?", "do you have the following disabilities or medical conditions: Learning disability (dyslexia)?" and "have you failed to complete homework in the past year?" The second set of questions asked students to compare themselves with their peers. Two questions surfaced as significant predictors: "how they rate their academic ability" and "how they rate their self-confidence". Based upon these findings, the university may wish to look at interventions that would improve self-confidence and better identify learning disabilities

## **02.05.10 The Effect of Race and Gender on Perceptions of Wellness on University Students**

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

**Charlotte, Dzul-Garcia** *Northeastern State University*

**Mark, Giese** *Northeastern State University*

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

The Effect of Race and Gender on Perceptions of Wellness in University Students Charlotte Dzul-Garcia, Ahmet Ozturk, Mark Giese, and Richard Hoenes The purpose of this study was to determine if significant racial or gender differences on wellness perceptions of university students existed. After IRB approval, a short 10-item, bubble style questionnaire was distributed to 301 students prior to the beginning of one of their classes. These data were self-reported. After collection, all surveys were scanned into SPSS. A Two Way Analysis of Variance with race and gender serving as two category (independent) variables and the answer to each question as the dependent variable was used to determine any differences between the main effects. Four questions showed significance ( $p < .05$ ) within levels of race or gender. The males reported they had a significantly higher degree of regular exercise (question #1), ate better (question #2) and dealt better with stress (question #3) than did their female counterparts. With reference to race, Caucasians were more informed than their Native American classmates on consumer issues. These data could be valuable to campus organizations whose goal is to promote physical activity and wellness. Perhaps health promotion strategies should be presented in a more appealing way to females. This information suggests that consumer information courses could be useful for Native American students.



## **02.05.11 Comparison research of sport culture between Qiang minority in Chinese southwest area and Cherokee in Oklahoma**

**Wei,Shi** *Northeastern State University*

Sport is a very important part in culture, and also one of the carriers for national culture, it gradually appears and develops along the human history of civilization, then becomes various sport cultures with different national characters. Chinese southwest area is a place where has plenty of minorities, and with colorful, juicy minority sport resource, but people know little about it because the barriers of geographical environment. America is a strong sport nation which has very advanced well known competitive sports, school sports and public sports, however the American Indian sport culture is also a mystery for most of us. This research compared the intension of the sport culture between Qiang minority in Chinese southwest area and Cherokee in Oklahoma. Conclusions drawn from this study :

1. Qiang minority sports cultural inheritance and development in a specific geography, subject to regional economic and cultural development and impact are the mainstream sports culture of Asian sports culture formation;
2. The sports culture of Cherokee is rooted in the original North American sports culture, development of the twists and turns in the history of changes and tenacious;
3. Both sports and cultural patterns are showing a trend towards nature;
4. Two sports cultural development requires not only a good external environment support, needs to stimulate internal causes of self-development.

## **02.05.12 Using the Historical Progression of Cherokee Stickball to Create Physical Education Curricula Based on Best Practice in Current Research**

**Kathy,Hixon** *Northeastern State University*

**Vanessa,Anton** *Northeastern State University*

This study examines the historical progression of Cherokee stickball over time—overlaying it with current best practice research in physical education. Because we live in such a diverse world, it is important to teach students to understand and respect other indigenous populations. Teaching multicultural games and activities in physical education provides an opportunity for students to experience cultural differences (and similarities), and can make history “come alive” (Murphy, & Maeda, 2012). However, current research in physical education contraindicates some of the practices in traditional stickball (in its various forms over time). This study looks at both current and historical research in order to create cultural curricula that are developmentally appropriate, yet culturally informative for school age children. It systematically examines an array of stickball practices over time in order to create modified methods of teaching based on best practice research.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

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

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

##### **02.06.01 Combined Physical and Voice Training For Parkinson's Disease**

**Amanda,McClelland** *University of Central Oklahoma*

**Jacilyn,Olson** *University of Central Oklahoma*

**John,Ahrens** *University of Central Oklahoma*

**Kyle,Covey** *University of Central Oklahoma*

**Lacey,White** *University of Central Oklahoma*

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

The primary purpose of this study was to estimate the feasibility of group physical fitness and voice treatment for individuals with Parkinson's Disease. The second purpose is to report changes in pre-to-post outcomes on measures of fitness, balance, bone density, voice perturbation and noise, vocal intensity, and maximum phonation time as the result of a simultaneous physical fitness and voice treatment program. Combining physical and voice training in a dual purpose program is anticipated to be successful because both types of training rely on similar principles to elicit results. Eight males with Parkinson's Disease attended 60 minute sessions, three times per week for four weeks. Vocal measures were obtained using the OperaVox application program and the Voice Handicap Index. Physical measures included aerobic fitness, muscular strength and endurance, agility, and flexibility. Changes in pre-to-post outcomes of physical and voice measures were compared. Increase in vocal and physical performance was noted after participating in this pilot study. Results indicated that receiving voice and physical therapy simultaneously can be helpful for individuals with Parkinson's disease. More research is needed with this type of therapy.

## **02.06.02 Current and Desired School Psychological Services: Perceptions by Education Professionals**

**Amy, Barnett** *Southwestern Oklahoma State University*

**Robin, Sobansky** *Southwestern Oklahoma State University*

The National Association of School Psychologists (Blueprint III, Ysseldyke et al., 2006) identifies two objectives of school psychological services: (a) enhancing the competence of students, including academic/cognitive and social-emotional areas of functioning, and (b) building and maintaining the capacity of systems so they are able to assist students to become competent. However, a review of available research suggests that school psychologists are often limited in the scope of their practice. To gain a better understanding, stakeholder perceptions of current and desired school psychological services should be considered. The purpose of the present investigation is to determine current perceptions held by educational professionals, including administrators, teachers, as well as service providers. The study specifically addresses: (a) level of knowledge, satisfaction, and perceived helpfulness of school psychological services; (b) perceptions regarding the roles and functions of school psychologists; and (c) future desired roles and functions of school psychologists. Results will lead to an increased understanding of the field in regards to actual practice and existing models, as well as a better conceptualization of training needs. An increased understanding by stakeholders of school psychologists' roles and functions may lead to an increased demand for services, thus an increase in enrollment in training programs.

## **02.06.04 Grammar Knowledge and Response to Instructional Methodology in SLP Curriculum**

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

**Lyndee, Stovall** *University of Central Oklahoma*

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

The purpose of this study was to document the current grammar knowledge of students across the speech-language pathology (SLP) curriculum and investigate the effect of the online instructional methodology of segmenting to aid in information processing. Accordingly, segmenting online content by 'chunking' information is thought to increase learning. Therefore, the hypothesis was that those students who were randomly assigned to the online instructional group given information using the segmenting principle would evidence increased performance on post-instruction surveys compared to pre-instruction surveys. Participants were students enrolled in junior, senior, and first-year graduate level SLP courses. The first year graduate students in SLP completed grammar knowledge surveys both pre- online instruction and post-instruction. Findings included cross-sectional data from surveys completed by all students and pre-instruction surveys by 1st year graduates. Data was compared by instructional level. Findings also included comparative data. The first year graduate students were randomly assigned to one of two online instructional groups: segmented or a non-segmented. Results from the pre and post surveys were compared by group.

## **02.06.05 Learning Environment Research: Empowering Teachers and Learners as Change Agents**

**Linda, Harris** *University of Central Oklahoma*

Decades of learning environment research have demonstrated students' perceptions of their classroom environments can influence a variety of developmental outcomes (Fraser, 2012). Based on a correlational study, this poster presents learning environment research as a rich avenue for engaging educators in action research that can allow teachers to create adaptive classrooms. With student perception feedback in hand, teachers are empowered to partner with their students to implement changes that can yield improved outcomes. At all times, teachers remain in control of their own class data and likewise, plan their own interventions. This action research approach acknowledges the capability and necessity of classroom teachers to engage in meaningful research to bring about positive change in partnership with their students. Serving as a model for action research, this study asked, "What is the relationship between students' person-environment fit (PE fit) and their academic performance in writing?" As a result of this poster presentation, attendees can envision a process by which they begin or expand the process of action research by seeking students' input while adaptations are still possible. In this way, action research can be introduced and/or expanded in classrooms across the state. Reference Fraser, B. J. (2012). Classroom environment (2nd ed.). New York, NY: Routledge.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

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

###### **03.01.01 The Curiosity Cabinet: A Means of Social and Political Control**

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

The concept of the Curiosity Cabinet appeared in 16th century Europe and was appropriated into the homes and public spaces of the colonial elite in the United States in the 19th century. This paper focuses on the culture of collecting and displaying art of the Native Americans in curiosity cabinets by examining three collections of Native American artistic production: the Peabody Essex Museum, Thomas Jefferson's "Indian Hall" at Monticello, and William Clark's Indian Museum. First, the paper demonstrates the role curiosity cabinets played in creating societal stereotypes of the native population while enforcing ethnic and social inequalities, as well as strengthening the national identity of the United States. These concepts contributed to the emergence of the Indian as the embodiment of the primitive man. Second, the paper emphasizes how the curiosity cabinets served to control and frame the Natives culture as primitive through displaying an amalgam of collected artistic and cultural productions. Third, the paper will discuss the curiosity cabinet as a visual rhetoric, thus celebrating the collectors place in justifying the Western expansion and establishment of the new country, the United States of America. Understanding the role curiosity cabinets played in shaping the image of the Native Americans is important since similar reductionist images in popular culture and media accompany the social and cultural marginalization of the Native Americans.

### **03.01.02 The Scientific and Artistic Impact of Bioart**

**Darby, Heard** *East Central University*

**Katherine, Seals** *East Central University*

**Thelma, Scribner** *Southeastern Oklahoma State University*

Science and art. These are two words that are not often used together, except as opposites. Science is mathematical, quantitative, and methodical, while art is whimsical, visual, and allegorical. But are they really that different? When considering the human body, art and science are united in one organism. Artists have sought to represent the human body since the beginning of art history. From the Venus of Willendorf (28,000-25,000 BCE) to the conception of performance art, the human body has been a fascinating and integral part of the development of art. Now, in the past two decades, art and science are being united in bioart. What is bioart? Bioart: an artistic practice which utilizes tissues, bacteria, and other biological and life processes to inspire and create art. The implication of bioart, both scientifically and artistically, are extensive. Often times the artwork is created in laboratories, with extensive cooperation between artists and biologists. Not only are the distinctly different subjects merged, but the individuals are likewise encountering each other and their respective fields at a new level. In the last decade, laboratories and organizations dedicated to bioart have been founded throughout the United States and Europe. Using the model of other bioartists, I have created a body of work within the realm of bioart. This piece represents a study of the human body, particularly the organ system, on a microscopic level.

### **03.01.03 Art? or Artifact? A Thematic Art Curriculum**

**Cassi, Sheppard** *Southeastern Oklahoma State University*

**Gleny, Beach** *Southeastern Oklahoma State University*

This thematic unit explores the ideas and definition of the terms "art" and "artifact". Throughout history cultures have created objects. Often creations were and are simply for aesthetic purposes. However, many objects were created for other purposes. Some were created as functional objects, while others were created as narratives of people's lives and history. The purpose of this unit is to focus on created works to determine the maker's intent and purpose. Students analyze and make critical judgments about "art" or "artifact" and produce artistic works that in future years could be considered "artifacts". Students are guided to make decisions and defend what constitutes an artifact, as well as what makes a work of art, "art". In the unit lessons, students practice critical thinking and evaluation to be able to explain the difference between the two terms, which expands their abilities to process information as well as make connections in cultural relations between the past and present. These integrated art lessons address artistic, creative, research, and written components as well as utilize individual and collaborative efforts.

#### **03.01.04 Singapore: Sexualized Spaces, Gay Ghettos and Confinement**

**Mickayla, Fisher** *University of Central Oklahoma*

Singapore is known for its religiously and culturally diverse communities. The concept of hidden space is represented in Singapore through the regulation on sexuality. Under strict social control speaking about being gay or anything dealing with the hidden society of gay culture in Singapore is an automatic fine with the Singaporean government. In Singapore having a sexual partner or a relationship with someone of the same sex is illegal and action will be guaranteed to be taken when it is visible to the heterosexual public, by police or public on-lookers. Homosexuals living in Singapore are confined to specific areas that on the outside appear to be heterodominant, but on the inside the structures are homodominant creating a hidden space where gay men and women are able to be themselves. There is also a high rate of singlehood, having no interest in having a relationship or creating a family, in Singapore. In Singapore's culture having a family as soon as possible is a priority due to the low rates of fertility. Gay people in Singapore use the concept of not wanting to have children, marriage, or a family as a cover up for societal norms to hide their sexuality. The major discussion will examine the construct of sexual minorities and how they developed sexualized spaces within Singapore, as well as Singapore as a sexualized prison.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **02. Dance**

##### **03.02.01 Eighteenth Century Neoclassicism and the Development of Ballet**

**Robyn, Pasternack** *University of Central Oklahoma*

The Neoclassical Movement of the Eighteenth Century had a significant influence on the development of ballet technique. It was during this time that ballet shifted from a baroque-based dance divertissement in opera to an independent performing art. The purpose of this research is to analyze the technical transformations that took place particularly when Neoclassicism was at its height. Neoclassical art of this time became a conduit for the progression of ballet because it focused on rigorous standards and classical simplicity. To assimilate these ideals ballet had to change which led to an increased need for technical exploration. The dance vocabulary expanded into expressive movement that demanded greater physical prowess and precision. It was also during this period that dancers began to experiment with dancing on pointe. As a result of these changes, ballet gained a new respect within the art community and progressed into the stylized dance as it is known today.

##### **03.02.02 Social Media: "Vine"ing for Attention**

**Rebecca, Craig** *University of Central Oklahoma*

In my research, I proposed that social media has an effect on people cognitively, creatively and relationally. I used dancers, choreography, lighting and costuming to communicate and to encourage both the dancers and the audience members to realize how much time they are on social media websites. I proposed a survey to my cast members at the beginning of the semester and was astounded to see that most knew they used social media sites a lot but they did not know exactly how much. Upon the conclusion of the choreography and research project, I began talking to my cast members about what they learned from the process. One dancer, Hannah Dudek said, "relationships with other people should be more important than technology. You should enjoy your relationships with your friends more than technology." While another dancer told me that she was much more aware of when others were on their phones versus actually interacting. For her, it had been the norm to see others on their phones all the time but now, it struck her as abnormal. This process change was exactly what I was hoping my cast members would experience.



## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **03. Design**

##### **03.03.01 Teaching Bootcamp: Confessions from an Experienced Newbie**

**Samuel,Ladwig** *University of Central Oklahoma*

As creative expression continues to expand into different media and even non-media, it is difficult to have a broad enough experience and toolset to guide students effectively. As James Elkins suggested it's likely that art cannot be taught, but ultimately even he concluded that (egos aside) we are already doing the best we can. As a non-traditional student, my foundations coursework varied widely, and my teaching coursework has been much the same. I have experienced foundations as an undergraduate design student simultaneously taking design and art foundations courses, a design graduate student teaching foundations in an art foundations program, and as design faculty in a design foundations program. My presentation will cover how my academic and professional experience combined with "teaching bootcamp" prepared me to teach in the trenches while highlighting the things for which I was unprepared. I will also compare approaches used at two different institutions in preparing instructors to teach foundations curriculum.

##### **03.03.02 Drawing the Narrative from Within: Using a Meditative Psychological Evaluation to Facilitate Image Creation in the Illustration Studio**

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

**Keith,Webb** *University of Central Oklahoma*

Inspired by the idea of symbolism and association from Carl Jung, the project titled A Walk Through the Forest asks sophomore and junior illustration students to visualize, journal and produce a black and white mixed media image. The objective of this project is to demonstrate to the student that under the same conditions, each possesses uniqueness, of which, only they are capable of rendering their solution and that the outcomes are endless. Under the instructor's direction, seven stations were visited during the imagined walk and each station contained an object or symbol of importance. The content of the environment was the creative responsibility of the student and each participant was instructed to look, listen, hear, taste and touch during their meditative journey. All traveling illustrators recorded their experience with as much detail and proceeded with thumbnail, rough and comp phases towards their final solution. Through the pictorial representation of these imagined events, students created rich introspective stories containing a diversity of emotions, memories, and narrative outcomes. Many of these solutions became the foundation for expanded short stories or illustrated series later in upper division coursework. The presentation will include examples from a body of student work spanning thirteen years.

### **03.03.03 Inspiring simplicity**

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

Walter Gropius, the instructors at the Bauhaus, and the work done by Jan Tschichold for the New Typography had powerful, and lasting impact on the history of design. The innovations of these movements and the individuals that led them inspired people like Otto Neurath and Otl Aicher to create rules and order for their designs. Neurath revolutionized Information Graphics following World War I with his development of the Isotype, while Aicher was involved in the creation of the iconic pictograms for the 1972 Munich Olympic games. Information graphics are defined as visual designs that present facts with usually as little decorative or nonessential material as possible and in as legible and compact manner as possible, (Drucker & McVarish, 2013) and the implication is that in these designs the content is both accurate and unbiased (Wildbur & Burke, 1998). The influence of both the Bauhaus and the New Typography led these innovators of information design to produce designs that were extremely legible, accurate and unbiased, which became the ultimate goal of this type of design. This paper will look into the philosophies from the Bauhaus and the New Typography that led to the successful design of and standards set by Neurath and Aicher, and ask the question are designers still inspired by these rules and standards today?

### **03.03.04 Telling Stories: A designer's mark on the world**

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

Thesis: How designers utilize the ideation process to share their voice and how that impacts the world. The issue being explored is how the ideation process provides the opportunity of including personal experiences and perspectives and the impact of putting their voice out into the world. At a time when society is striving to personalize the impersonal communication, designers must realize the responsibility of sharing their voice and how that shapes the world. Looking at how the ideation process allows this to happen will bring awareness and realization to an increasing need in society. It's important to put this in context; to show the value of organizing personal experiences and perspectives into meaningful expressions of communication that transform clients needs into relatable messages. Designers always share a piece of themselves and should understand and acknowledge how the ideation process allows this to happen and the impact it has on the world. Designers share their voice by telling their stories in pieces sprinkled throughout their work, contributing to the world and adding value by creating connections and meaning for the audience. The methodology is based on research in sociology, psychology, the design process and personal observation.

### **03.03.05 Art and Illustration: Are Educators Missing the Big Picture When Developing Studio Curriculum?**

**Keith,Webb** *University of Central Oklahoma*

In keeping with tradition, art, illustration and design educators collectively agree that the ability to create foundational renderings in the form of sketches represents the initial visual dialog between the student and the instructor. With further instruction, and perhaps input from peers, the student internalizes the vast majority of the process which is filled with experimentation, self reflection, mechanical and technical problem solving driving toward the final illustrated solution. The road to image completion includes both cognitive and psychomotor hurdles for the student to overcome, adapt and build upon. Students and educators find themselves with more choices than ever in the methodology of image creation. With these options comes the added institutional pressure to learn and teach ever-changing and expanding software in our curriculum to meet industry expectations. This paper discusses the results of a study that applied a pedagogical model and practices using Bloom's Revised Taxonomy in the development of illustration studio objectives in comparison to the traditional studio model. Included in the discussion are the results of student performance outcomes using applied progressive objectives based on the taxonomy during three academic semesters. This study incorporated both quantitative and qualitative methods of investigation in its conclusion and its findings reflect the outcomes of beginning, intermediate and advanced illustration students.

### **03.03.06 Exhibiting the Political Cartoon**

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

**Rukmini,Ravikumar** *University of Central Oklahoma*

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

**spencer,gee** *University of Central Oklahoma*

The University of Central Oklahoma decided to create a traveling exhibit out of a collection of political cartoons that had been donated to the university. In this study researchers charged with the development of educational materials to accompany the exhibit decided to conduct a survey in order to determine the needs of the traveling exhibit. The survey was conducted at a soft opening where viewers were asked a series of questions regarding their knowledge of the content of the collection as well as additional information that they would like to see. The results were compiled by the researchers and assessed for the use of the creation of materials.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

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

##### **03.04.02 Developing Educational Gaming to Facilitate Comprehension of Discrete Math Concepts**

**Ryan,Dang** *Cameron University*

Educational gaming software has shown its effectiveness in providing powerful learning experiences for high school students. Virtual environments foster real-world application of the knowledge presented in-game. Games function as aids in development of student competency. Currently, evidence beyond anecdotal reportage to support the use of computer games in education is limited. The dominating areas of research in educational gaming exist solely in the disciplines of medical education and business management studies. Our objective is to develop a novel working beta-model concerned with increasing discrete math cognitive skills in college-aged students in an engaging and fun manner. Cameron University's Computing and Technology Department development team is authoring a novel video game to facilitate learning of discrete math concepts. The subsequent beta-testing and field-testing of this original product serve as anecdotal evidence in support of educational gaming. As of 2015, the current team is developing an animated video game, designed to facilitate learning Set Theory. The team will systematically revise and develop beta-tests of game. Revisions of game determine functionality, interactivity and level of fun. Project development by current Cameron students, professors, and associated facilitators is an ongoing process that will continue within Multimedia Design Department after graduating class leaves.

### **03.04.03 Gamification of Algebra Concepts**

**David,Chatman** *Cameron University*

**Don,Aguilar** *Cameron University*

**Jeffery,Gholson** *Cameron University*

**Justin,Gholson** *Cameron University*

**Kenneth,Austion** *Cameron University*

**Nicholas,Gautier** *Cameron University*

**Robert,Dill** *Cameron University*

**Usef,Faghihi** *Cameron University*

Many non-mathematics majors struggle when it comes to understanding and solving mathematical problems. Many approaches have been tried, but students often find them boring and are unwilling to use them. It has been shown that games can help people better learn mathematical concepts such as the quadratic formula [1]. Over the past few months, with the collaboration of a team from the Multimedia Department and computer science majors at Cameron University, we have been developing a game students can use to learn how to solve a quadratic equation. In this presentation, I will discuss the steps we used to plan the game, such as using storyboards to plan out the game's aesthetic, theme, and gameplay functionality. The storyboard consisted of the characters that we've called "minions," attached to which are numbers corresponding with the numerical coefficients in the quadratic formula. The minions compete against each other in order to get into a spot on a warship. The user needs to click on the minions marked with the wrong numbers to prevent them from getting on the ship while only allowing the minions marked with the right numbers to get into the boat. In this presentation, we will show how a user can play a game and learn how to solve a quadratic formula.

### **03.04.04 Stressing Cooperative Learning in Small Groups Based on Self-determination Theory**

**Abbas,Johari** *Cameron University*

**Karisha,Jackson** *Cameron University*

**William,Johnson** *Cameron University*

The project is funded by the "Tuck and Anna Pittman Endowed Lectureship in Instructional Technology" grant through the School of Science and Technology at Cameron University. It reports on findings of a study that measures students' needs for relationships in a small group multimedia learning environment. Emphasizing cooperative over competitive learning is the primary teaching strategy of the study. The study applies self-determination theory as its theoretical framework. Much research on self-determination theory supports the development of competence and autonomy by establishing a solid relationship among learners (Deci & Ryan, 1985; Deci & Ryan, 2000; Ryan & Deci, 2000). The study also supports the very core value of Cameron's Plan 2018: "Student learning as our top priority," Action 1.10, "Improve student learning through innovative uses of instructional..." and Action 6.1, "Focus resources to achieve optimal student learning."

### **03.04.05 A Narrative of an Undergraduate Research, Scholarship, and Creative Activities Project Cameron University/School of Science and Technology**

**Abbas,Johari** *Cameron University*

**Karisha,Jackson** *Cameron University*

**William,Johnson** *Cameron University*

The project is funded by the “Support for Undergraduate Research, Scholarship, and Creative Activities” grant from the School of Science and Technology at Cameron University. It reports on scholarly activities of a few minority undergraduate students. The purpose of the project is to produce a rich literature review on Self-Determination Theory and Service Learning approaches and their interrelated motivational connections to seek research funding via a qualitative (case study) research design. The project will provide in-depth research activity, support, and publication opportunities for minority students who have not previously been engaged in any faculty-mentored undergraduate research process. Hence, the fund supports undergraduate research and is used to increase the number of undergraduate scholars who are participating in research, and will have at least a scholarly product- a review of research publication. The intent is to submit the results via a research paper to Oklahoma Journal of Undergraduate Research.

### **03.04.06 On Becoming a Competent and Autonomous Learner in Instructional Technology**

**Abbas,Johari** *Cameron University*

**Dominique,Thomas** *Cameron University*

**Karisha,Jackson** *Cameron University*

**William,Johnson** *Cameron University*

The project is funded by the “Public Service Company of Oklahoma (PSO) Endowed Lectureship in Instructional Technology” grant through the School of Science and Technology at Cameron University. It reports on a study that measures students’ needs for competence and autonomy in a flexible open learning environment. The primary focus of the study is to examine a learning strategy that allows learners to have full control over their own multimedia skill developments. The study applies self-determination theory as its theoretical framework. Much research on self-determination theory supports the development of competency and independence in learners that are motivated and have a high desire to achieve (Deci & Ryan, 1985; Deci & Ryan, 2000; Ryan & Deci, 2000). The theory derives much from modern cognitive motivational theories including Bandura’s self-efficacy theory. In light of the findings, the researchers will outline answers to questions such as what teachers can do to meet their students’ need for competence and autonomy. The study also supports the very core value of Cameron’s Plan 2018: “Student learning as our top priority,” Action 1.10, “Improve student learning through innovative uses of instructional...,” and Action 6.1, “Focus resources to achieve optimal student learning.”

### **03.04.07 From Content to Form: Death in Top Grossing Children's Animations**

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

In Dec, 2014, the British Medical Journal 2014 published (16 December 2014) the results of research conducted by medical professors in Canada and England entitled "Cartoons Kill: casualties in animated recreational theater in an objective observational new study of kids' introduction to loss of life." They compared 45 of the top grossing G or PG rated children's animated films from the United States to the two highest rated United States adult movies for each year (90) to measure how long it took from the start of the film to the first incident of an important character's death. Anthropomorphized characters were excluded from the research. Their results show that very young children are being exposed to death of a significant character within 1:13:08 to 1:25:22 minutes of film time. Half the adult movies and two thirds of the children's animated movies had death scenes of important characters. The authors discuss the psychological effects that result from this kind of exposure at such a young age. This poster visualizes the forms of deaths identified in the research and the psychological effect on young children.

### **03.04.08 Two-Lives**

**Ali, Madanipour** *Cameron University*

**Jeffrey, Gholson** *Cameron University*

**Justin, Gholson** *Cameron University*

**Usef, Faghihi** *Cameron University*

Two lives is about 2 young teenagers; Susan and Adam. They meet two fellow students who turn out to be drug dealers selling at their school. This story illustrates how a simple answer can make two lives turn out very different by the end. The story is to illustrate the consequences of drugs and how addiction can often lead more than just health problems. The story starts off with Adam and Susan on their way to class they soon come across Julie and Eric who are welcoming and friendly to Adam and Susan. They hang out and talk for a little while and are gracious and kind. Then Julie and Eric begin to coax Adam and Susan to try out some drugs which are in a box, Susan refuses and walks away. Adam is about to the same but then is convinced by Eric and Julie to try the drug. When Adam takes the drug he ends up loving it and goes to hang out with his so called new friends. For a time Susan is lonely until she eventually meets new friends. Adam on the other hand has no idea that Eric and Julie don't really care about his well being and are only interested in making money. The story follows the two teens, Adam and Susan on separate paths. Susan goes from being alone to making great new friends, studying and working at her grades. Adam ends up resorting to stealing from his family and his addiction eventually drives him out of the house. The story ends with the Susan and Adam meeting again, but this time completely opposite then what they were from before.

### **03.04.09 Gamifying Mathematical Concepts—Intersection**

**Andrew,Rutter** *Cameron University*

**Brock,Crosby** *Cameron University*

**Douglas,Schlumbohm** *Cameron University*

**Jawad,Drissi** *Cameron University*

**Kenneth,Austion** *Cameron University*

**Trevor,Harrigan** *Cameron University*

**Usef,Faghihi** *Cameron University*

Intersection is a mathematical concept which instructors have attempted to explain to students in many ways. There exist several online resources which attempt to teach intersection in ways which will engage the learner. To our knowledge there are no readily available e-learning software programs which teach this concept in enjoyable ways. Research has shown that learners exhibit improved performance when mathematical concepts are presented in methods that those learners find inviting. The development team is in the process of engineering an e-learning software suite that will teach mathematical concepts such as set operations (e.g., union, intersection, complement, difference) and Cartesian products in ways that will be fun for the learner. In this presentation, all of the aforementioned concepts will be demonstrated using gamification techniques.

### **03.04.10 Gamification and Union in Discrete Math**

**David,Chatman** *Cameron University*

**Han,Xiong** *Cameron University*

**Jawad,Drissi** *Cameron University*

**Kaitlynn,Birch** *Cameron University*

**Ryan,Dang** *Cameron University*

**Usef,Faghihi** *Cameron University*

It has always been a characteristic of higher-level mathematics to have a steep learning curve. If a student doesn't like the challenge of mathematics to begin with, the student won't be willing to dive into it. Why is this? I believe it is the fear of the unknown. Average students cannot see themselves in a situation in which they will ever need to use the higher-level mathematics. Research studies have shown that games can help people learn mathematical concepts such as the quadratic formula [1]. We have been working on a project that will add the fun of playing video games to learning set theory, a concept taught in discrete math. During the presentation, I will discuss the approach we have been taking to create a game that we will use to help teach union, an entry-level concept in set theory. First, I will discuss the process of planning and making a storyboard that will serve as a blueprint for developing the game. Here, I will talk about how we have collaborated as Multimedia Design students and Computer Science students while trying to complete this project. Also, I will explain the elements of multimedia design that were valuable throughout developing and creating the aesthetic of the game. Once the game is completed, we expect to test the game with the help of discrete math students in fall of 2015. We hope we can later build upon this game to include more and more concepts other than set theory in the area of discrete math.



### **03.04.11 Violence in Children's Media**

**David,Chatman** *Cameron University*

Because of my fascination with computer generated images, I went to see How to Train Your Dragon 2 and was amazed with how much of a children's film this turned out to be for me. Ian Colman states, "We conclude that children's animated films, rather than being innocuous alternatives to the gore and carnage of typical American films, are in fact hotbeds of murder and mayhem." Death and hard choices were two important themes that stood out and promoted me to do a literary review to learn what the current research had to say about the psychological impact these type of animated movies have on small children. I will also discuss some of my findings concerning children's and parents' perspective of death and violence in movies and other media that children have access to via the internet.

### **03.04.12 Designing Tomorrow**

**Leigh,Tucker** *Cameron University*

Art is apart of life that is experienced throughout various places. There are no boundaries of what it can be or what it is. Designs created today can have an impact on the future, and there are no limitations that will stop the creativeness that tomorrow holds. Designing and creating are processes that can be used to create many things. The main objective of this presentation is to show the design principles, and allow the visual aspects of art to come alive.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **05. Music**

##### **03.05.01 “Music for Peace”: A Public School Initiative and CD Recording**

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

In a world of challenges to the human soul, music and art fill a huge need for self-expression and communication. With increase of violence and bullying in the public schools there is a great need and urgency to communicate and discuss the danger and destruction of intolerance and violence with young students to lead students to better choices and a life of tolerance, love and forgiveness. My project intends to offer a solution through music and lyrics, live performances and discussions and active student involvement in my presentation/performance “Music for Peace”. The school concert program will include three works: David Maslanka’s “Remember Me” for Cello and Piano, Michael Colgrass’ “Wolf” for Cello and Kangwa Mundende’s “Forgive”, based on a text by Maya Angelou. All selected works have a particular program (program notes) with a strong message: expressing peace, tolerance and believing in the good of human beings. In addition, each school presentation will conclude with a discussion of UCO students and public school students about the music performed and program notes intending to promoting passion for music and tolerance. The entire concert program will be recorded and published on a CD to provide a permanent reference for the public schools and for distribution for the entire educational and performance community through internet sites to ensure replication of the project throughout the country.

### **03.05.02 Student Learning and Musical Development through Creative and Scholarly Performance Activities**

**Austin, Burton** *University of Central Oklahoma*

**Brian, Lamb** *University of Central Oklahoma*

**Brittany, Richardson** *University of Central Oklahoma*

**Faith, Skinner** *University of Central Oklahoma*

**Joshua, Phelps** *University of Central Oklahoma*

The University of Central Oklahoma Wind Symphony Recording Project is a creative and scholarly activity with a significant research component. The UCO Wind Symphony has released four (4) compact disc recordings since the spring of 2009, resulting in national recognition of the band program by leading critics and composers. The performance quality of the UCO Wind Symphony has dramatically improved over this same time period, as evidenced—albeit anecdotally—by the aforementioned comments and feedback from music critics, composers, audience members, faculty, the student performers themselves, and even our community of peers in the college wind band world. The goal of the Primary Investigator in this proposed recording project is to collect and interpret data to support the subjective claims put forward by other that the recording process and student collaboration with faculty in scholarly and creative activities, does in fact, increase student learning and improvement. By using a Scholarship of Teaching and Learning (SoTL) approach, the purpose of the assessment element in this recording project will be to demonstrate that such projects facilitate deep, meaningful learning, develop problem solving skills in an ensemble setting, and lead to increased musical understanding.

### **03.05.03 Pentascale Pairs**

**David, Forbat** *University of Central Oklahoma*

Pentascals are normally understood to be the first 5 tones of a major or minor scale and may also be called pentachords, 5-finger patterns, or "positions." Pentascale study offers students of all ages a means by which to develop important music reading and hand-coordination skills. Through pentascale study, intervallic reading is solidified under each hand without the distraction of having to address fingering issues. Furthermore, for many, pentascals provide an initial introduction to major and minor tonality. The purpose of this project was to expand upon pentascale study so they are presented and studied in pairs. Specially-composed exercises and pieces allowed students to play major (WWHW) pentascals built on I and V simultaneously. In minor keys, minor (WHWW) pentascals built on i and iv were similarly paired.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **06. Theatre Arts**

##### **03.06.01 Women in Theatre**

**Rebecca, Ford** *Southeastern Oklahoma State University*

Women in Theater; the very first woman to be on stage, Margaret Hughes. Rules and regulations on why women were not aloud on stage. Finally the process on how women came to be on stage.

##### **03.06.02 Art Communication and Theatre's different organizations.**

**Justice, Graham** *Southeastern Oklahoma State University*

The different clubs, organizations and involvement that a person can be involved in with Southeastern Oklahoma State University's department of Art Communication and Theatre.

##### **03.06.03 Performing for Control**

**Jessica, Black** *Southeastern Oklahoma State University*

During the 17th Century, fleas from rats spread the disease known as the Bubonic Plague, which wiped out 20-60% of the English population. Morality was lost. Prostitution and gambling ran rampant. The Church decided they would take back control... With entertainment. "Corpus Christi" Cycles would travel from town to town teaching the common folk stories and lessons of the Bible. "Corpus Christi" literally means "Body of Christ," and the cycles meant that the troupe would travel on wagon from venue to venue performing. Sure, The Church wanted the people to gain their morality back, but also, they wanted more bodies at the services. And what better way to gain more control than Theatre!

#### **03.06.04 A Collaborative Production Design for Jones and Schmidt's "The Fantasticks"**

**Christopher, Miller** *Northeastern State University*

**Robyn, Pursley** *Northeastern State University*

**Scott, Pursley** *Northeastern State University*

Musical theatre is a style that requires a variety of unique skills on the part of all production members. For the designers of such a production, the challenge is to provide the audience with a visual aide to accompany the music, which is at the heart of the production. Designing for a musical production differs from designing for a straight play in that a musical typically allows for more exaggerated and whimsical imagery. In developing the production design for this particular production of "The Fantasticks," the designers were inspired by the natural theatricality of the play.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **01. Communication**

##### **04.01.01 “Sometimes I Have to Announce My Feminism and I Don’t Mind Doing That”: Instructor Self-Disclosure of Feminism in the Classroom**

**Elaina, Ross** *Northeastern State University*

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

Self-disclosure has been a rich area of study by Communication Studies scholars; however, research has not examined specific instructor self-disclosures in the classroom. This study focused on instructor’s self-disclosure of feminist beliefs to build a body of research focusing on the revelation of beliefs in the classroom. Therefore, this study adds to our conceptual understanding of self-disclosure and is valuable to feminist instructors as well as other instructors who are not sure how to self-disclose their belief in the classroom. We argue that instructors should self-disclose feminist beliefs when relevant to course material. The conceptual understanding of the self-disclosure from feminist instructors leads to a better explanation of how a belief system should be revealed to students and how a belief system can shape the pedagogy utilized to discuss course content.

##### **04.01.02 Saved by the Bell or Walking with the Dead?**

**Bruce, Hartley** *East Central University*

**Jessica, Fulgium** *East Central University*

In this project I created a survey to see how much television college students from a certain age range. I did this in order to see if there was a connection between the times when they were younger to now. Also to see if maybe there would be a chance to get more people into watching future television.

### **04.01.03 Walking out of the Household: Becoming an Outdoor-Woman (BOW) Outdoor Program**

**Brenda,(Cochran) Bradford** *Northeastern State University*

Becoming an Outdoor-Woman (BOW) is an outdoor program founded in Minnesota in 1994 and developed by Christine Thomas, an Associate Dean and Professor of Resource Management at the University of Wisconsin-Stevens Point College of Natural Resources. Becoming an Outdoor- Woman (BOW) was created exclusively for women to learn outdoor skills in a safe, encouraging, and supportive environment. Women are interested in learning outdoor skills and when the opportunity is offered, they are lining up in greater numbers for the chance to be involved. BOW workshops have currently expanded to 44 states and nine Canadian provinces as well as offering outdoor activities abroad. The focus of this study will cover the history of Becoming an Outdoor-Woman, a comparison of this organization with similar outdoor programs and why the program can effectively increase female participants' outdoor skills and self-esteem. By introducing an exclusive women-only grassroots support group, this study aims to explore females' interest and personal growth, as well as the program's broad national appeal and its enrichment and cooperation among women.

### **04.01.04 'Scandal': Framed or Innocent?**

**Tricia,Price** *Northeastern State University*

"Scandal" is one of America's most popular dramas, which covers the life of Olivia Pope, a PR Specialist in Washington D.C., and her firm which defends the public's opinion of our nation's elite. There are more people viewing this show every Thursday night than there are Americans paying their taxes on time annually. The popularity of the show may result from the use of political rhetoric, titillating plot twists, or media framing. Media framing is producing information in a skewed way that influences the choices people make about how to process that information. In this particular study, I am curious how the production frames their message. To discern to what extent the show "Scandal" implemented media framing throughout the three existing seasons, a media analysis was conducted over "Scandal". After viewing three seasons, I found that two out of three episodes involved procedural, cultural resonance, and magnitude frames. These frames continually compete with each other because procedural frames fit media practices, while cultural resonance frames make sense of the audiences' world by reducing ambiguity and endorsing social norms and values, and magnitude frames are generally endorsed by the elites within society such as politicians.

### **04.01.05 The Portrayal of African American Males in the Media**

**James,Parker** *Northeastern State University*

Paulo Freire (1970) states, "so often African American males hear that they are good for nothing, know nothing, and are incapable of learning anything—that they are sick, lazy, and unproductive—that in the end they become convinced of their own unfitness." Fighting the many stereotypes is almost inevitable when that is what is being shown or projected about the average African American male. This research focuses on how African American men respond to the four major stereotypes in the media, including be angry men, homosexual tendencies, the all American athlete, or the infamous 'acting white'. By analyzing the transcriptions of twenty face-to-face interviews, this research aims to reveal how the African American males perceive themselves through what the media projects and to what extent the media plays in the future of African American male's success. Twenty African American student leaders will be interviewed. The student leaders share the passion for change within injustices in the media. Some of the participants will be chosen through personal connections and the other students will be recruited from led activist groups and student leadership forums. This study will challenge the four common media portrayals of African American, and provoke change and raise awareness of the injustices that are portrayed in the media of African American males.

#### **04.01.06 “Whore : Stud :: Gay :Weak : Vocabulary and the sexual double standard”.**

**Philip, Curry** *Northeastern State University*

This research focuses on the sexual double standard, and when and why college students are communicating negative terms towards one another. The double standard means that men have greater sexual freedom than women do. In the same sense men can also be scrutinized for not engaging in sexual activity. It's no secret that women are sometimes scrutinized by engaging in sexual activity with more than one individual. Terms like slut, whore, floozy, and tramp are used to describe a promiscuous woman, while a promiscuous man gets deemed player, casanova, stud, and lady's man. If a man does not want to be sexually promiscuous he seems to be looked down upon as not being a man, gay, or weak. In order to prove the existence of the sexual double standard, this research aims to recruit participants in a Midwest university, with 25 male and female freshman and seniors. Using these will give me multiple perspectives of how the freshmen who are just starting college use certain terms also the sexual double standard. Also how seniors who are more mature feel about the subject. The survey will show which words are commonly used among college students, how these words are interpreted, and in what ways the usage of these words reinforces the sexual double standard.

#### **04.01.07 Oklahoma's Post Office Murals: A study of American Indian images.**

**Austin, Weaver** *Southeastern Oklahoma State University*

**Shannon, McCraw** *Southeastern Oklahoma State University*

From 1934-1942, the United States federal government established an ambitious arts program to decorate federal buildings throughout the nation. The Section of Fine Arts – a division of the U.S. Department of Treasury – commissioned over 1100 murals for the nation's Post Offices. Through artistic competitions and assignments, Oklahoma communities received thirty-one of these murals to adorn local Post Office buildings. Few scholarly articles exist on Oklahoma's Post Office murals. The previous research on Post Office murals has focused on the 'cultural tastes' of local communities, southern culture, and as forms of 'democratic art' negotiated by artists, local communities, and the Department of Treasury. As a form of government-sponsored visual rhetoric, this paper focuses on Oklahoma's Post Office murals and the native and non-native muralists' depiction of American Indian images. We argue these murals represent acts of confrontation and resistance and need to be interpreted against the backdrop of the Great Depression and the Indian Reorganization Act of 1934. In conclusion, these murals represent an emerging Oklahoma identity focused on transitions in land use and expansion in Oklahoma Territory (western Oklahoma), and American Indian self-governance and cultural renewal in Indian Territory (eastern Oklahoma).

#### **04.01.10 Measuring Media Use for the City of Muskogee Campaign**

**Dana, Eversole** *Northeastern State University*

The city of Muskogee's mayor requested that we design a survey and conduct focus groups look at branding for the city and media use. Using James Grunig's situational theory's four-point involvement scale, we developed a new method to evaluate the city's media strategy and plan that included using 15 different types of media and information sources.



#### **04.01.11 Standard Beauty is not one Size Fits all**

**Jacqueline, Alworden** *Northeastern State University*

The American Psychiatric Association (2000) states the body size of glamorous models is often more than 20 percent underweight. Compared to average women in today's society. The pervasiveness of these messages allows women to internalize these irrational standards society has created. I intend to analyze 8 advertisements targeted at women from the magazine Cosmopolitan. The advertisements will be selected on a scale of modest images to sexualized images of women and men. I will interview both male and female participants drawn from a convenience sample at a Midwest university. Drawing interviews from both sexes I hope to gain better understanding from all perspectives. Participants will be asked a specific set of questions before and after viewing the advertisements, including questions such as, "does this ad make you feel empowered or inadequate, explain?" From these interviews I hope to find recurring themes from participants. I also hope to establish a significant connection in regards to self-perception before and after viewing these advertisements. I anticipate most participants' view of self will be diminished after the participant compares themselves to these ads. From this I hope to gain a better understanding of social comparison.

#### **04.01.12 Mass Communication Class Research Survey**

**Georgiana, Hallock** *East Central University*

Mass Communication Research Analysis Prepared by: Georgiana Hallock Written by: Georgiana Hallock December 4, 2014 The Mass Communication Research Survey began November 19, 2014 and was concluded November 30, 2014. Out of the 125 Mass Communication majors, 23 people completed the survey. All 23 people responded via a "web link." Of the 12 days that the survey was open, Friday, November 21 was the day with the most responses, totaling 7. And the days with the least amount of responses were Wednesday, November 19 and Sunday, November 30. Totaling 1 response on both days. The survey was developed with the website Survey Monkey and was created with ECU's Mass Communication students education in mind. As of now there is no research class offered at ECU for Mass Communication majors and/or minors. By conducting this online survey, the survey team was hoping to find out how interested the students are in adding a research class as a required elective. The link to the survey was posted on several social media sites along with the information about the survey and the Informed Consent. The survey, survey information and Informed Consent were also sent out via email to many of the Mass Communication majors and minors by their advisor. Question One: What is your gender? Question one had one of the highest answer rates with no skips. 74 percent of people who took the survey were female and 26 percent of people who took the survey were male.

#### **04.01.13 Study Habits**

**Bruce, Hartley** *East Central University*

**Kelsi, Jones** *East Central University*

My proposed study was one that compared traditional student study habits with non-traditional student study habits. I used social media sites Facebook and Twitter as well as student email to get my survey from SurveyMonkey out to the student subjects. My findings were that the data that I have gathered seems to say that traditional and non-traditional students are very similar in the ways they study and prepare for classes and tests.

#### **04.01.14 Collapse for Change: Rana Plaza and Multinational Corporations**

**Katelynn, Wright** *Cameron University*

**Ron, Price** *Cameron University*

In 2013 a factory collapsed in Rana Plaza, Bangladesh. It was something that could have been avoided, but occurred due to negligence. With this garment factory directly connected to multiple nations (fourteen, according to reports), this incident became more than just an issue within Bangladesh. It has become a multinational crisis. Thus, the analysis of such an incident can only be explained through consideration of numerous entities: Bangladesh, the Alliance for Bangladesh Worker's Safety, and the Walmart/Gap Initiative. Upon investigation, the intention was to concentrate on a specific entity and their interactions with Bangladesh after the crisis in Rana Plaza. However, the multinational influence was too much of an important factor. With a globalized world comes globalized problems, and globalized neglect. This crisis of a multilateral scale was confronted by the Alliance for Bangladesh Worker's Safety, unilaterally by Walmart/Gap Initiative, and once mobilized by the Bangladesh population. This rhetorical analysis was informed by the research perspectives provided by Halford Ross Ryan and B.L. Ware and Wil A. Linkugel, authors published in the Quarterly Journal of Speech.

#### **04.01.15 Hide Your Wife: Domestic Violence in the National Football League**

**Ron, Price** *Cameron University*

Professional athletes face constant judgment as they reign in the spotlight of their game. They must be machines on the field, destroying anyone who comes in between them and victory; leaders and role models off the field. Required to be leaders, as well as effective communicators, professional athletes face similar challenges in corporations. By using correct and effective apologia strategies, Roger Goodell, the Commissioner of the National Football League and Ray Rice, Baltimore Ravens running back, were able to demonstrate, appropriately, how to handle accusation and defense. Being able to communicate effectively the strategies of this case will not only improve the image of the NFL, but will allow these two men to be seen as leaders. This research will evaluate a leader and an athlete on opposite sides of the same situation, in the same organization, in terms of the accusations directed at them as well as their apologetic strategies. The effectiveness of their responses will be evaluated by the paradigms utilized by Halford Ross Ryan and B.L. Ware and Wil A. Linkugel in published articles in the Quarterly Journal of Speech.

**04.01.16 "Understanding Cultural Differences through Practice: A Reflection on International Friendship Program" Hsin-I Sydney Yueh, LaTasha Atcity, Northeastern State University**

*Hsin-I Sydney, Yueh Northeastern State University*

*LaTasha, Atcity Northeastern State University*

To be competent intercultural communicators, we need to be aware of social and cultural barriers that prevent people from understanding each other. This concept is easy to learn, but difficult to embody into our everyday life. A semester-long course activity, International Friendship Program, is designed to increase the interactions between American students and international students. Throughout the interactions students are required to confront the challenges observed during the experience, including cultural, social and language barriers. These particular interactions are vital to bring light to the adversities international students face, as they adjust to their new surroundings. American students are then forced to step out of their "comfort zone" and acknowledge the diversity international students bring. In this presentation, I will reflect on my own experience as a participant of this program and explore how immersive learning can be a useful tool in studying intercultural communication. First, I will describe the activity requirements. Second, I will show the record of how my international partner and I establish our regular meetings. Third, I will analyze the specific cultural barriers we encounter in our meetings, and finally, I will provide my reflections on how to define friendship, how to manage cultural differences, and my own growth in intercultural communication.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

### **02. English**

#### **04.02.01 Press Releases: Creating Buzz**

**Julie,Nguyen** *Cameron University*

Over the years, the Lawton Public Library has contributed to the Lawton Community. The library puts on various programs for a wide range of people. For young adults, the Lawton Library hosts variety of events including game nights, teen book readings, art competitions, and craft events. For younger children, the library provides storytelling, arts and crafts, and movie nights. The Lawton Library is a cornerstone in the Southwest Oklahoma. This poster and presentation will discuss my experiences writing press releases for the library as well as how the press release itself continues to serve as a vital genre for nonprofit organizations. As Lehtimaki, et al (2011) suggest, the traditional press release is often the only way to disclose essential information to intended audiences and have the unique benefit of being able to be read in a variety of media and platforms, including newspapers, radio, and websites. Further, as Graube, et al (2010) suggest, the press release serves a "gatekeeper" function for an organization often only inviting participation by particular groups. The poster and presentation will show how press release writing for the Lawton Public Library validates much of the current research concerning the press release genre.

#### **04.02.02 Edutainment: Tangential Learning in Video Games**

**Katherine,Johnson** *Cameron University*

Objective: To highlight and promote the use of video games as a medium for learning, via tangential learning. Thesis Statement: Video games [including those for entertainment] are full of educational, real-world value as well. Video games can be used as a medium for education for all age groups via tangential learning. Methodology: Surveys, interviews, hands-on research, and academic research. Findings: My hypothesis is true; video games [even those – and I'd even say especially those for entertainment purposes] are incredible teaching tools, via tangential learning, due to game developers taking inspiration from real-world things; history, literature, science, mythology, etymology, religion, and so much more.

### **04.02.03 Felix Culpa in Sir Gawain and the Green Knight: Why Gawain and his Troth Were Always Meant to be Broken**

**Morgan,Sorrell** *University of Central Oklahoma*

This paper analyzes the difference between “play” and “game” in the trials of Sir Gawain and the Green Knight. In this paper, “play” will refer to the mock fights the knights of Arthur’s court engage in, while “game” refers to an orchestrated series of tests that Gawain must overcome. Questions about this poem often debated by scholars are if Gawain sinned by keeping the girdle, if his confession that excluded said “sin” counted, and if he could have theoretically won by giving up the girdle. The purpose of this paper however, is to prove that these questions are a moot point because the games that Gawain took on were designed to cause his failure. Thus, the conclusion is that Gawain never could have succeeded, as the moral lesson of the poem is felix culpa—a fall with a grander design in order to teach humility to both Gawain and the reader.

### **04.02.04 Coquetry in Courting**

**Emily,Davis** *East Central University*

From the first early American novel concerning courting and the tragedy of unrequited young love to the diary of a young man committed to finding love by jumping through all the right hoops, “Coquetry in Courting” journeys through the courting rituals of the late 18th century and early 19th century noting the similarities and highlighting the differences that time period play in the development of young love. This paper considers both fictional literature (Hannah Webster Foster’s *The Coquette*) as well as firsthand accounts of a journey through changing courtship rituals and phases (diary entries from Isaac Mickle from the age of fourteen to the age of twenty two). By focusing on the importance of letter exchange and intimate interpersonal relationships, enhanced by written communication, “Coquetry in Courting” showcases both the struggle and the victory that young romantics endured and often experienced during their teenage years and often times their early twenties. As forty years pass between the time period of Foster’s novel and the documented start of Isaac Mickle’s courting experience, readers see Mickle encountering new challenges concerning courting which Foster’s characters did not encounter in *The Coquette*. Though the struggles are not the same, both stories of youth pursuing both romantic love and sensible love spark interest in whether love is a concept which is eternal or whether the meaning of love changes with

### **04.02.05 Comparative analysis of Dictyostelium discoideum and Myxococcus xanthus**

**Carrie,Vega-Hughes** *Northwestern State University*

Evelina is an epistolary novel about a seventeen year-old girl from the English countryside thrust into the high society of London. Evelina’s only means of navigating society, successfully, is to learn all of the manners of which to conduct herself properly and avoid scandal. Along the way, many of the supporting characters are terrible examples for Evelina. She is able to comment on their bewildering behavior and work out why their breach of manners is so unbecoming and inappropriate. This poster will take a look at five examples when manners were breached in the novel, and compare and contrast the relevance of those manners in today’s society from the results of a campus wide poll. The quantitative data will come from a survey the author has provided to all levels of college students at Northwestern Oklahoma State University. The survey results will be broken down by age, gender, and college-level classification (i.e. freshman, sophomore, junior, senior).

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **04. Foreign and Modern Language**

##### **04.04.01 Native American Language Education Policy in Oklahoma: The Need for Native Language and Culture Education in Public Schools**

**Martyne,Chanslor** *Northeastern State University*

With 38 federally-recognized tribes, Oklahoma is home to 40 Native American languages, all of which are endangered. There have been many positive language revitalization programs throughout communities in the state, but these languages are still quickly losing ground among the most important speakers: children. Though many revitalization projects are focused on improving the fluency of children, such as the Cherokee Immersion School in Tahlequah, a relatively small percentage of Native children are reached by these programs. This paper proposes an addition to the current language revitalization programs in Oklahoma by creating partnerships with Native American Nations and public school systems to teach Native languages and cultures in all schools within the respective tribal jurisdictions. This paper shows the benefits of such a partnership for both Native and non-Native, including enhanced cognitive skills, better understanding of history and culture, and opportunities to connect with heritage. Methodology includes examining relevant research in the field, current language policy in Oklahoma, and the successes and problems of other school-based language education programs.

##### **04.04.02 Language Policy and Usage in Inner Mongolia**

**Xiao,Xiao** *University of Central Oklahoma*

While China is growing into a more open economy in the recent decade, Inner Mongolia, an minority autonomous region located in north China, has been exposing itself in a more diversified environment. Therefore, language policy and usage are also changing to help young people to face upcoming challenges. The research will explore such changes to illustrate how the whole society respond to this situation in Hohhot, Capital city of Inner Mongolia, China.

### **04.04.03 Traditional Chinese Medicine and its Importance in Chinese Culture**

**Lisangela, Arroyo** *Cameron University*

Traditional Chinese medicine is the use of herbal medicine and different physical and mental techniques that are used to help rid a person of different ailments that may affect them. Traditional Chinese medicine has been an important aspect of Chinese culture throughout China's history. In order to understand the roles TCM plays in Chinese people's lives, this research explores TCM's health function, essential components, and its fundamental medical theories that are behind its use. Using research through internet sources, and university library database, the author found that first, TCM's health functions are to cure a wide range of ailments from headaches to skin disorders and anxiety by restoring balance in a person's chi with herbal, mineral, and sometimes animal medicine. Second, the essential components that make up traditional Chinese medicine are Yin and Yang, herbal medicine, and physical techniques such as acupuncture and Tai Chi. Thirdly, the fundamental medical theory as to TCM's potency in healing is due to many of the herbs and physical techniques such as Tai Chi do provide health benefits to the body in alleviating some ailments. Gradually people are becoming more interested in the use of TCM for their health outside of China.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **05. Geography**

##### **04.05.01 Immigration, Ethnicity, and Community Formation in the Oklahoma City Metropolitan Area**

**Clarissa, Everly** *University of Oklahoma*

**Kane, Watkins** *University of Central Oklahoma*

**Michelle, Brym** *University of Central Oklahoma*

Two important shifts in the settlement patterns of immigrants to the United States have occurred over the past few decades: the immigrant populations are increasingly of Latin America, Asian, and Sub-Saharan African origins. The destinations of these groups are expanding in the rapidly growing urban areas of the South, Southwest, and Great Plains regions. Oklahoma City (OKC) has experienced significant overall growth in the 21st century, including growth due to international immigration. Our research seeks to understand how Oklahoma City's immigrant populations, through the spatial configurations of the ethnic communities they support, have become part of the city's changing landscape. To identify the types of ethnic communities present in the OKC metropolitan area, our study first maps the residential patterns of the foreign-born populations using data from the U.S. Census American Community Survey. The discovered settlement patterns are compared to the location distribution of places that serve immigrant communities: worship offering non-English services and ethnic grocery stores. The research explores human agency by interviewing ethnic business owners on their reasoning for establishing their company within the city. Our findings support the idea that ethnic communities in new destination cities like Oklahoma City are not separate, but these ethnic clusters constitutes for multiethnic neighborhoods and ethnoscaapes throughout OKC.



## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **07. History**

##### **04.07.01 From VC to Draft Dodgers: The Vietnam War Teaching and Traveling Trunk**

**Amanda, Moore** *University of Central Oklahoma*

Why do many students show little interest in modern American history; how can we change that? Traveling trunks provide an innovative way to engage students learning history. I have created one of the only trunks for instructors to use to teach about the Vietnam War. In addition to coverings key battles during this “conflict”, the artifacts teach the history from a cultural standpoint on both sides of the war. It breaks down the negative cultural view on the Vietnamese people and the issues on the American home front with political stances. The trunk will create an exciting and new experience for students to learn more about this modern part of history. It includes timelines, primary resource documents, and objects from the Laboratory of History Museum at the University of Central Oklahoma, and it incorporates fun activities to get the students involved with hands-on learning. The lesson plans are formatted for different grade levels, typically for the high school and college audience. Beyond the school systems, the trunk can be used to help educate the community on the subject matter. These activities are meant to encourage the audience to think critically and to appreciate primary documents and sources. The Vietnam War traveling trunk is a new method for history teachers and museums to reach out to their students and to change the face of learning in an innovative way.

##### **04.07.02 The Intimacy of Attraction: Foundations of British First World War Diplomatic Strategy towards the United States.**

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

Before 1912, Britain and the United States had come to disagree on two issues whose resolution would set the tone for the diplomacy between the two countries during the First World War – the revolution in Mexico and the Panama tolls controversy. Generally covered as an issue unrelated to U.S. neutrality in the war years 1914-1917, the Panama Canal Tolls issue and the Mexican issue were very much tied together as part of the British diplomatic plan. The importance of British actions concerning Mexico and the Panama tolls was not apparent at the time, but it later proved to be a precursor to Britain’s diplomacy with the United States during America’s period of neutrality. The British offensive over the Panama tolls was a successful diplomatic tactic that also allowed the Foreign Office to gain knowledge about the power structure within Wilson’s administration. This paper will examine how British diplomacy interacted with the United States in the years prior to 1914 to foster a sense of camaraderie and understanding between the two nations. The evidence provided will create a clear picture of how Britain pressed the Wilson administration on the Panama Tolls issue while adroitly tying the issue to who it would support for the Mexican presidency. This paper will also tie this groundwork laid by Britain to its diplomacy towards the United States during the period of American neutrality.

### **04.07.03 Will That Kill You? Hazardous Materials Found in Museum Collections**

**Joanna,Butterworth** *University of Central Oklahoma*

Hazardous and toxic chemicals have been found and used in museum collections for decades. The major issues for museums when collecting artifacts is knowing which chemicals have been used on the objects, what inherent toxins are already contained in or on the artifacts, and how to properly care for them. There are two types of hazardous materials in the collections: those exposed to hazardous chemicals during preservation and those that inherently contain hazardous materials. Each item that is presumed or known as contaminated should be properly labeled and set aside so that everyone who enters the collection will know that the item contains hazardous material. Several Conserve O Grams from the National Park Service address many aspects of dealing with contaminated collections and objects, as does the Museum Handbook, Getty Conservation Institute Journal, and the Journal of the American Institute for Conservation. Knowing about hazardous material in a museum's collection or as part of a historic building's structure are important additions to a Collection Policy as well as the Integrated Pest Management policy.

### **04.07.04 Treaties and Massacres: Lipan Apache Sovereignty and Relations With Mexico, 1836-1856**

**Neal,Hampton** *University of Central Oklahoma*

Questions of autonomy pose difficulties in the relationship of nation-states to "transnational" indigenous peoples. My research argues that Lipan Apache, or Ndé, political relations with Mexicans emphasized rupture and only partial recognition of the sovereignty of this indigenous nation from 1836 to 1856. While the Republic of Texas and the United States conducted treaty relations with the Ndé, Mexico, in its official capacity, refused to negotiate intergovernmental agreements with this Native people. Local political entities, however, established accords with the Lipan, with particular regard to the development of a black market or "shadow" economy. The Mexican government deemed it necessary to either indoctrinate Native Americans into the dominant society or perpetuate massacres against recalcitrant subject peoples, including the Ndé. My research utilizes materials found in the archives of the Benson Latin American Collection and the correspondence of caudillo Santiago Vidaurri at the Center for American History at the University of Texas at Austin. Indeed, my research reveals the significance of treaties and massacres in the development of political relations between the Ndé and the settler state of Mexico.

#### **04.07.05 Promises of a Honey Pond & A Fritter Tree: Rural Western Oklahoma Pioneer Women, 1900-1910**

**Cheryl, Caffee** *University of Central Oklahoma*

Lula Hall-Morrow left Bono, Texas with her husband and four children in 1900, and headed north into Oklahoma Territory to homestead one of the last remaining plots of land in the western portion of the state. The family hoped for a bright future, mortgage free, where they could live off the land and strive for economic success. By utilizing an autobiography written by the Morrow matriarch and the Indian-Pioneer papers, this work explores the lives of Oklahoma pioneer women and their families between 1900 and 1910. It follows the day the young Morrow family, and pioneers moved to Oklahoma in a covered wagons and explores their lives in the first decade of homesteading. New settlers in western Oklahoma, contributed to the social and economic success of the new state as they established new communities and created successful farms and ranches. Resilient and adaptable, the frontier woman cared for a sick child and then went to the pasture to mend a fence. Within this framework, women voluntarily kept their domestic roles but developed autonomy and equal status in the social and economic ventures. They found happiness and contentment within their relationships as they worked alongside their husbands in satisfying partnerships on the prairie and stepped outside the boundaries of the domestic sphere. Through homesteading, rural women found their honey ponds and fritter trees, as promised by Uncle Sam in 1900.

#### **04.07.06 What is the true identity of the Minoans?**

**James, Gregory** *University of Central Oklahoma*

Since the year 1900 CE, the world has known of the Minoan Civilization. However, this peoples name is merely a designated term given to them by the romantic mind of Sir Arthur Evans. The true identity of these people is not known to us. But, through observation of Egypt during the 15th century BCE, evidence is given that the Minoans traded with the Egyptians. The Minoans are called Keftiu by the Egyptians. This theory that the Minoans are the Keftiu is subject to much debate by archaeologists. By looking at the Theban tomb-paintings and the wall paintings of Tell el-Dab'a, new light is shed on the possibility of these two people being the same. These relatively new archaeological findings give reinforcement to the idea that the Keftiu are in fact the Minoans.

#### **04.07.07 William E. Soothill: A Forgotten Sinologist and Missionary**

**Yue, Guo** *University of Central Oklahoma*

“Do you Christians throw their ancestral shrines into the cesspool? If everybody went to heaven, wouldn't it be full? Do foreigners really take out our people's hearts and livers? Are not you foreigners scheming to get held of our country?” These questions about Christianity had been asked since the late nineteenth century. The story of William E. Soothill plays out to show the consequences of the law of extra-territoriality in China from 1883 till the fall of Qing dynasty. He is one example allow us to see not only the mentality of the British missionary, but also the insight of the Chinese peasants. This paper will talk about William E. Soothill , the British Methodist missionary who contributed himself to the church service in Wenchow. He was educationist, translator, lexicographer, and wrote many important works on Chinese religion, politics history and literature. As a missionary, and his radical in bringing business ideas into the mission works that distinguish him from the other.

#### **04.07.08 The Malayan Campaign and Burma 1940-1942**

**ANDREW,TRAXLER** *University of Central Oklahoma*

World War II was the largest armed conflict in history. Most Americans know about the attack on Pearl Harbor, D-Day, and the theaters of Europe and the Pacific. In one forgotten theater, Burma; the United States, Great Britain, Australia, China, and various other countries, fought the Japanese in the mountains along the Malayan Peninsula and the Burma Road. This project separates, the Burma Theater into three different phases with the primary work concentrated on the first phase. On December 8, 1941, the Japanese attacked the Malayan Peninsula and Singapore. The British became the primary defenders (British Controlled Territories), and fought delaying actions down into Singapore where they eventually surrendered 90,000 men, on February 15, 1942, to the Japanese Forces. Those lucky of enough to escape retreated to Java and into India. The second phase consists of troop buildup and a change in command, while the third is the re-establishment of forces into Burma. Research for this topic included a trip to the Liddell Hart Military Archives and the Imperial War Museum Archives in London, England.

#### **04.07.09 The Frontlines of the Rhetorical Battlefield: U.S Feminists, Anti-feminists, and the Abortion Debate of the 1960s and 1970s**

**Brianna,Gomes** *University of Central Oklahoma*

The history of abortion and reproductive rights go back as far as biblical times. This research focuses on the 1960s and 70s in particular, looking at the arguments of both the feminists and anti-feminists sides in different forms of media. Concentrating on the rhetoric and emotional appeal used by both sides, the similarities between the arguments are apparent. While the feminists promote an case for the rights of all women, claiming women as the soul decision makers in regards to abortion, the anti-feminists promote an argument based in religious and moral background, claiming abortion is against God's will and introducing fetal rights. After comparing the two sides, the similarities in the arguments are clear, except that the emotional appeal used by the anti-feminists is much more graphic and assertive. This holds true to the present, where the same arguments, rhetoric, and emotional appeal emerge in the abortion debates daily.

#### **04.07.12 Rejected: the Voices of Irish Mothers Petitioning the London Foundling Hospital**

**Margaret,McCown** *University of Central Oklahoma*

The London Foundling Hospital served women with unplanned pregnancies for over two hundred years (1741-1951). However, in an almost untouched collection of rejected petitions (located with the Foundling Hospital records held by the London Metropolitan Archives), the women whose desperate pleas were refused are rarely acknowledged by historians. In the years before, during, and after the Irish Potato famine, more than two hundred Irish women applied. This research seeks to show why the governors of the Foundling Hospital rejected applications from Irish women, my theory being that it was based in racism. To do this, I surveyed well over 1000 petitions and selected only women with Irish surnames for the dates 1835-1854. I collected every piece of information I could, and created a complete snapshot of each woman's application. I was shocked by how many more pieces of correspondence composed by the other was available, as well as the high rate of literacy, compared to the records of others whose children were accepted. The other major finding in this research reveals the overwhelming statistics that show these women lived and worked in the honorable parts of London, contrary to the popular belief.

#### **04.07.13 Cameroon Bamiléké Kwifo Zoomorphic Mask: The Secret Society and its Power Through the Masks**

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

The University of Central Oklahoma (UCO) Chamber Library houses a pronounced collection of African Art from various African societies. This paper focuses on the art of the Kwifo society from the Cameroon grasslands region. The art reflects the framework of the social, cultural, religious, and political institutions at the time of its creation. The Kwifo society was a powerful governmental administrator that balanced the power of the kings and secured the social order of the kingdoms through the use of different types of masks, such as human male and buffalo masks. Both masks were used by the Kwifo society in different rituals and ceremonies. The human mask linked the society with royal ancestors, led performances, contained medicine for healing and empowered the prestigious objects, such as the kings' thrones and stools. This paper discusses the Bamiléké Kwifo Zoomorphic Mask from the UCO collection. The paper argues that due to its zoomorphic qualities, the mask took the major role in the Kwifo society. The first section will discuss the Cameroon grasslands artwork associated with the power of the kings, titleholders, and the Kwifo society. The second, the complex symbolism of the Bamiléké Kwifo Zoomorphic Mask is discussed in Kwifo's political, social, religious, and economic power and zoomorphic quality of the mask. The third section demonstrates how the zoomorphic qualities of the Bamiléké Kwifo Zoomorphic Mask reflect the mask.

#### **04.07.14 The Central Plate of Central State College's YWCA**

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

In 1954, the Young Women's Christian Association of Central State College sold a commemorative plate called the Central Plate. Based on primary research conducted at the University of Central Oklahoma and the Edmond Historical Society & Museum, this paper focused on the history of the YWCA Central Plate and the images on it of the five buildings, which the members believed best represented student life on campus. Sources used in this paper are personal communication, archival material, newspaper articles, and the plate itself. Only sold during two semesters, the women sold eighty plates and raised \$200. In part because of this plate, the YWCA USA fundraised a centennial fund of \$5,000,000 to celebrate the one hundred year anniversary of the organization in 1958.

#### **04.07.15 Hume and Smith on the Original Contract**

**Darian, DeBolt** *University of Central Oklahoma*

In this paper, I compare and contrast the arguments of David Hume and Adam Smith on the original contract. Hume's essay "Of the Original Contract" was first published in 1748 in a small collection entitled "Three Essays, Moral and Political." Adam Smith's views were first articulated in his "Lectures on Jurisprudence, Report of 1762-3." A more polished version of those views appeared in Smith's "Lecture on Jurisprudence, Report dated 1766." Hume does not allude to any particular theorist, but Smith mentions John Locke. I conclude that Smith's arguments against the original contract are derivative from Hume. This is not surprising given that David Hume was Adam Smith's mentor and friend.

#### **04.07.16 Church Revival in London: Keeping the Roman Catholics at Bay.**

**Alan,Chaple** *University of Central Oklahoma*

Claim: This research draws upon British social, political, and religious reactions to perceptions of imperialism in the mid-nineteenth century. On a cultural and regulatory level, the anti-Catholicism in London, brought about by the Restoration of the Catholic hierarchy in 1850, caused an upsurge in proposals for the demolition and renovation of many local churches. This effort left some to fall under scrutiny for allegedly being potential locations for the Tractarians and pro-Catholic denominations; some within a few blocks walk of St. Paul's Cathedral itself. The nature of such reaction correlates to fears of encroaching Roman Catholicism, which at the time imperialists perceived as a threat. More specifically, this scenario shows how the public and city administrators attempted to regulate where certain denominations could flourish in London after the 1850s. Thesis: The City of London attempted to regulate and contain the spread of Catholicism after the restoration of the Catholic Hierarchy in 1850 by drastic renovations and demolitions of notable and historic churches throughout the city. The content of this research relates to the principle theme of reaction against a perception of imperialism extending from a foreign sovereignty; for the British, they identified it as the papacy in Rome. As it remained clear the government could not simply oust the hierarchy due to a considerably large number of a domestic Catholic population, regulation and containment became th

#### **04.07.17 Remembering the 70th Anniversary of the Invasion of Okinawa**

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

This year we celebrate the 70th anniversary of the invasion of Okinawa. Most of the men who participated in the landing are now gone; but they should not be gone from our memories. 12,000 American soldiers and nearly 100,000 Japanese and Ryuku Islanders died in this operation. My poster will present an overview of the literature and images, past and present of the American and Okinawa experiences in an attempt to assess the long lasting impact of the second great war on humanity.

#### **04.07.18 Endogamy in Roman-Egypt: If It Was Incestuous, Why Morals Allowed It, and What Factors Contributed to It**

**Morgan,Sorrell** *University of Central Oklahoma*

This paper lays out a comprehensive overview of endogamy in Roman-Egypt, including how the matter was viewed from a moral standpoint and what factors specific to the time period of the first through third centuries within Roman-Egypt contributed to its widespread use. First, the paper addresses whether these marriages occurred frequently enough to warrant merit and if they involved genetic siblings, whether full or half. This is accomplished by analyzing primary sources, including letters between spouses and Roman census reports of Egypt at this time. The paper then widens its scope to examine how incest and endogamy were viewed in ancient Egypt before Roman conquest and other contemporary cultures, including those of Rome, Greece, and Iran. Finally, the unique social, ethnic, and economy situations of third century Roman-Egypt are taken into account and shown to be contributing factors to the acceptance of endogamy.

## **04.07.19 Leonardo da Vinci's Contributions to Art and Science: An Influence of Anatomy Throughout the Ages**

**Morgan, Sorrell** *University of Central Oklahoma*

This paper analyses Leonardo da Vinci's contributions to art and science within the Renaissance time period, before his Notebooks were rediscovered and published in the eighteenth century. The paper draws connections between da Vinci's anatomical studies and his artwork to show how the two influenced each other to create some of the greatest masterpieces of the Renaissance. In addition, his studies in both art and science were able to influence his contemporaries of the sixteenth century through his Treatise on Painting. The Treatise itself and the writings of aforementioned contemporaries were examined to prove that although the bulk of da Vinci's work remained unpublished until the eighteenth century, he still had a profound effect on the scientific thought of the Renaissance.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

### **04. Liberal Arts**

### **08. Political Science**

#### **04.08.01 How v. Hallito: A Content Analysis of Native Americans Portrayed in Political Cartoons**

**Tiffany,Postoak** *East Central University*

The research conducted in this paper was to see how Native Americans are portrayed in political cartoons in the mainstream media. About 50 cartoons were found in the Cagle archive using specific search terms related to Native American issues. The cartoons were analyzed using content analysis. The data demonstrate that most of the time stereotypes are used in cartoons of Native Americans, Native are portrayed as very passive political actors, and that many recent cartoons relate to the issue of using terms like "Redskins" as a sports mascot.

#### **04.08.02 The Game of Chicken: game theory and its possible applications**

**RaLyssa,Taylor** *Northwestern State University*

This presentation will explore the world of game theory in political science. The research will be used to demonstrate the effectiveness of game theory on solving a simple question. It will, more precisely, attempt to provide the observer with the most opportune moment in which to engage in a particular behavior given a set of predetermined options. The research will then be applied to additional potential situations involving modern geopolitical matters such as terrorism and global security matters.

#### **04.08.03 CRISIS IN CORRECTIONS-THE IMPACT OF THE "TRUTH IN SENTENCING ACT OF 1999 ON THE OKLAHOMA CORRECTIONS SYSTEM.**

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

THIS PRESENTATION WILL EXAMINE THE IMPACT OF THE "TRUTH IN SENTENCING ACT" PASSED IN OKLAHOMA IN 1999. THE FOCUS OF THE PRESENTATION WILL BE ON THE CONSEQUENCES OF REQUIRING FELONY OFFENDERS TO SERVE 85% OF THEIR SENTENCE INSIDE A CORRECTIONAL FACILITY IN THE STATE OF OKLAHOMA; THE PRESENTATION WILL EXAMINE THE ISSUES OF PRIVATE PRISONS, PRISON OVERCROWDING, RIOTS, AND INMATES ESCAPING FROM OKLAHOMA CORRECTIONAL FACILITIES SINCE 1999.



#### **04.08.04 "Use of Deadly Force;Justicifiable Homicide or Injustice"**

**Claudia,Parker** *Southwestern Oklahoma State University*

This presentation will exam several cases where deadly force was employed by law enforcement on unarmed civilians. Cases to be examined included Trayvon Martin, Luis Rodriguez and Micheal Brown. The presentations will contain an analysis of the justifiable use of deadly force.

#### **04.08.05 Supreme Court Oral Argument: Policy, Facts, Hypotheticals, or Law?**

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

**Skylar,Riddle** *East Central University*

Supreme Court Oral Argument: Policy, Facts, Hypotheticals, or Law? The Supreme Court decided cases in part based on the oral argument provided by the parties. During the 2013 Term, the Supreme Court heard oral argument on 70 cases. This research uses audio recordings and transcripts to classify what actually occurred during oral argument. Many would assume that the Justices would speak only about law. Using content analysis, this research quantifies the amount of time and words spent not only on law and precedent, but facts, hypothetical situations, and policy. We also examine whether members of the Court or the oral advocates are more likely to initiate each type of exchange.

#### **04.08.06 "CHAOS IN CAPITAL PUNISHMENT"**

**Mary,Iliff** *Southwestern Oklahoma State University*

THIS PRESENTATION WILL EXAMINE THE CURRENT CONTROVERSY IN THE LETHAL INJECTION PROCESS IN THE STATE OF OKLAHOMA. THE OKLAHOMA STATUTES REQUIRE DRUG PROTOCOLS USING THREE DIFFERENT DRUGS TO COMPLETE THE EXECUTION. THE PRESENTATION WILL ANALYZE THE INCREASING DIFFICULTY IN OBTAINING THESE REQUIRED DRUGS AND THE STATE OF OKLAHOMA'S EFFORTS TO COMPLY WITH THE 8TH AMENDMENT WHICH PROHIBITS CRUEL AND UNUSUAL PUNISHMENT.

#### **04.08.07 Social and Political Empowerment of Women in the MENA and Sub Saharan Africa as a means of acquiring political voice**

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

This paper, the second in a series, focuses on the differences between social and political efficacy of women's movements in the MENA and Sub-Saharan Africa, with emphasis placed on women's social and political empowerment. How do we define "empowerment"? How do women in the third world move from the work of empowering themselves to finding their political voices, in a collective sense, and how do they use it to make social and political gains? Demonstrated here are the transformational qualities and characteristics of women's empowerment on the acquisition of social and political voice, or efficacy.

#### **04.08.08 A Comparison of Arguments for and Against Agriculture Subsidies in the Context of the 2014 U.S. Farm Bill**

**Marisa, Molnar** *Southwestern Oklahoma State University*

The success of agriculture subsidies has long been disputed by economists and policy makers. And the 2014 U.S. Farm Bill, the newest iteration of long standing, but ever changing set of subsidies started in 1933 with the New Deal, has not been excluded from these criticisms. The bill's creators claim that this bill will close the loopholes, expand crop insurance, and improve upon its 2008 predecessor, but will these changes be enough to combat the tide of public opinion in an environment where controlling the budget and shrinking deficit have moved to the forefront of many voter's minds? I intend to study and compare the arguments for and against agriculture subsidies, while presenting what evidence the bill has for its defense.

## **Abstracts from the 2015 Oklahoma Research Day**

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

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

#### **09. Sociology**

##### **04.09.01 Silent Victims: Children Removed From Drug Homes and Professionals' Perceptions of their Treatment and Outcomes**

**David,Newton** *University of Central Oklahoma*

**Elizabeth,Maier** *University of Central Oklahoma*

**Kathryn,Letourneau** *University of Oklahoma*

**Kathy,Bell** *Tulsa Police Department*

**Rashi,Shukla** *University of Central Oklahoma*

Little is known about children from methamphetamine homes. While the health consequences of drug exposure are generally understood, less is known about indicators of abuse and neglect and children's perceptions of these indicators. This study examines types of information that can be learned from children about methamphetamine homes through forensic observation reports as well as the identification of treatment processes through a survey of professionals working with drug endangered children. Examination reports were obtained for 107 children (60 boys, 47 girls) who had been removed from dwellings in a Midwestern city where methamphetamine manufacturing was suspected of occurring. The children were at risk of trauma due to activities in the home, separation from caregivers, and experiences during police encounters. Common observations were inadequate clothing, hygiene, and nutrition. The subsequent survey of professionals working with drug endangered children illuminated a general lack of understanding among professionals of the processes involved in identifying and treating children. Due to the conditions to which they are exposed, these children may be at greater risk for antisocial and other deviant behaviors such as drug use and criminal activity. Lack of standardized identification and treatment responses compound these risks. Further research on the short- and long-term impacts of drug exposure on child development is needed, as is a standardized method for identi

#### **04.09.02 An Examination of Global Methamphetamine Trends**

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

**Danielle,Stoneberg** *University of Central Oklahoma*

**Matt,Magness** *University of Central Oklahoma*

**Rashi,Shukla** *University of Central Oklahoma*

Methamphetamine is increasingly becoming a problem internationally. As the most widely manufactured amphetamine type stimulant (ATS), methamphetamine use ranks second only to marijuana as the most commonly used illicit drug worldwide. Few studies have examined methamphetamine from an international perspective. This study examines recent shifts in patterns of use, trafficking, and production occurring in regions around the world. Data were gathered from secondary sources including governmental drug assessments and media reports. Though the methamphetamine problem continues to be dynamic, recent indicators suggest it is becoming increasingly complex and expansive; various dimensions are appearing in new areas and shifts are being identified within and between countries around the world. Global trends and the limitations of sources of information currently available will be presented.

#### **04.09.03 Community partnerships in Juvenile Justice**

**Isabelle,Bidjanga** *University of Central Oklahoma*

This project aims at enhancing community collaboration with law enforcement and other community stakeholders for a safer and better environment for juveniles. In a bid to proactively prevent juveniles from getting involved in crime and help those who get in trouble, this project seeks to foster community development activities to sensitize youths both non-offenders and former offenders(reintegration into the society).

#### **04.09.04 Interstate Law Enforcement Aid**

**Austin,Ralstin** *University of Central Oklahoma*

**Holly,Hampton** *University of Central Oklahoma*

**Leslie,Terrell** *University of Central Oklahoma*

The graduate students in UCO's Crime and Intelligence Analysis master's program were asked to conduct research for members of the Association of State Criminal Investigative Agencies (ASCIA) regarding interstate mutual aid. Students examined current state laws in regard to providing mutual aid across jurisdiction lines and from that research develop model legislation that can be considered for introduction in the respective state legislatures to achieve a consistent nationwide solution.

#### **04.09.05 Use of Deadly Force: In Low Income and Minority Communities**

**Jeremy, Kenaston** *Northwestern State University*

The use of force, especially deadly force by law enforcement, has been an extremely debatable topic within the United States for many years. Two of the latest large scale examples of the issue are the 1991 case of the Los Angeles police beating an African American man, Rodney King, and the most recent shooting of Michael Brown in Ferguson, Missouri in 2014. The disconnect between the public's perception and law enforcement's definition of proper use of force leads to mistrust and various issues between citizens and law enforcement, particularly among low income and minority populations. The deadly use of force in minority populations has created hyper-sensitivity among minorities and low income populations. The purpose of the study is to correlate deadly use of force by law enforcement among minority communities to suggest that a change of current training and procedures of law enforcement is necessary. The findings throughout the research process has suggested that over history the same issues continue to exist and that a proper definition of change has not yet been met.

#### **04.09.06 Fracking: A Danger from Underneath**

**Joy, Kirchubel** *Tulsa Community College*

In the last couple of years, Oklahoma has been experiencing an increase in earthquakes. Not only has frequency increased but the severity of these earthquakes has increased as well. Earthquake preparedness has never been a staple of the Sooner state. Whether the cause is artificial or man-made, the implications will be significant. The paper covers the specific causes of the earthquakes in Oklahoma. Fracking or hydraulic fracturing appears to be the main cause of earthquakes in the Sooner state. Much research has been done to determine the cause of these earthquakes. The paper will be examining various scientific studies. Fracking was found to indirectly cause these earthquakes through the use of wastewater wells. The wastewater is a mixture of water and various chemicals that make it non-potable. Deep wells are drilled and the wastewater mixture is injected deep under the earth. These wastewater wells eventually result in the earthquakes and cause pollution to the water table. The use of these wells opens up concerns about water usage, groundwater safety, chemical disposal, and state regulations. Other states have implemented strict wastewater well guidelines and have resulted in fewer earthquakes. Currently in Oklahoma, there are no regulations on where the wells are located nor is there any regulation on what chemicals are in the wastewater. Fracking companies are on an honor system to divulge the chemical composition of wastewater.

#### **04.09.07 Challenging Inequality Through Ritualized Enactments: The Case of Notting Hill**

**J. David, Knottnerus** *Oklahoma State University*

**Jennifer, Edwards** *Northeastern State University*

This study investigates the Notting Hill Carnival, an annual ritual event in London, United Kingdom. Building on our previous research, we contend that the Notting Hill Carnival represents a special collective ritual event that is used to bring attention to social problems, such as inequality, affecting the black population within the Notting Hill section of London. Employing content analysis, we examine the Notting Hill Carnival as an annual ritual event, providing an understanding of the ritual dynamics which define the event. Further, we analyze the extent to which the carnival has become a prominent event in London. We conclude that the Notting Hill Carnival is an important ritual practice that demonstrates various themes such as social identity, conflict, unity, and culture.



## **Abstracts from the 2015 Oklahoma Research Day**

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

#### **05. Mathematics and Science**

#### **02. Animal Science**

##### **05.02.01 Investigation of Rickettsia rickettsii infections in Northeastern Oklahoma Dogs**

**Adam, Clark** *Northeastern State University*

**Dianne, Kirk** *Northeastern State University*

**Sallie, Ruskoski** *Northeastern State University*

The bacteria *Rickettsia rickettsia* is responsible for causing Rocky Mountain spotted fever (RMSF) in infected mammals. The American dog tick, Rocky Mountain wood tick, and Brown dog tick are the primary hosts and transfers the bacterium to a secondary host, such as dogs, during feeding. The purpose of this study was to investigate exposure to *R. rickettsii* in Northeast Oklahoma dogs currently exhibiting tick-borne disease symptoms, such as fever, lethargy, anorexia, and depression. Blood was collected from 26 dogs exhibiting tick-borne disease symptoms between September and December 2014 at a local veterinary hospital. Sera were tested for antibodies to *R. rickettsii* using an indirect immunofluorescent antibody (IgG) assay. EDTA-treated whole blood was obtained from all animals that tested positive for the antibody and end-point polymerase chain reaction (PCR) was employed to confirm the presence of the organism. Antibody testing revealed that 17 (65%) dogs had positive titers to *R. rickettsii*. Positive samples were evaluated by PCR to confirm the presence of *Rickettsia* spp. However, only 11 (65%) samples tested positive for the *Rickettsia* spp. spotted fever group *ompA* gene. These data conclude that while symptomatic dogs may test positive for antibodies to *R. rickettsii*, it doesn't necessary mean that they are currently infected with rickettsial bacteria.

## Abstracts from the 2015 Oklahoma Research Day

### Held at Northeastern State University

#### 05. Mathematics and Science

#### 03. Biology

##### 05.03.01 Effects of Fluoxetine on Corticosterone-Induced Neurotoxicity in PC12 Cells

**Baylee, Holbert** *Southeastern Oklahoma State University*

**Jonathan, Newsome** *Southeastern Oklahoma State University*

**Ning, Wu** *Southeastern Oklahoma State University*

**Sarah, Reagan** *Southeastern Oklahoma State University*

Major depressive disorder (MDD) is a common and life-threatening mental disorder over the world. Although the exact pathological mechanism of MDD has not been identified, some studies demonstrated that cellular mitochondrial defects might play a role in cell dysfunction or even death, which could relate to MDD's cognitive incapability and motor slowness. Some antidepressants such as amitriptyline and tranylcypromine can reduce such pathological effects. However, the mechanisms of such pharmaceutical effects are still unclear. This study investigated the cellular effects of Fluoxetine, a major serotonin reuptake inhibitor (SSRI) antidepressant, by using corticosterone-induced neurotoxic PC12 cells. The results showed that Fluoxetine could effectively protect cells from toxic environment by significantly reducing the numbers of cell conformational changes and cell death comparing to that of control group. The study provided the evidence that Fluoxetine might be not only a SSRI, but also a cytoprotective agent.



### **05.03.02 Effects of Fluoxetine on Corticosterone-Induced Neurotoxicity in PC12 Cells**

**Danielle, Khoury** *Southeastern Oklahoma State University*

**Heather, Wyrick** *Southeastern Oklahoma State University*

**Ning, Wu** *Southeastern Oklahoma State University*

**Patrick, Sharp** *Southeastern Oklahoma State University*

**Stephanie, Gunter** *Southeastern Oklahoma State University*

Major depressive disorder (MDD) affects many people around world. 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. The purpose of this study is to develop and validate a chronic unpredictable mild stress (CUMS) mouse model to facilitate future studies in MDD mechanisms and antidepressant drug development. The pure breed mouse strain was employed for this study. The mice were treated by 9 different stimulations with one randomly picked stimulation per day and no same type of stimulation in continuous days. After 5 weeks treatment, the mice were tested by a series of experiments to validate their CUMS status. The results showed that CUMS mice demonstrated weight loss, voluntary movement reduction, sucrose solution intake reduction, and swimming immobility time increasing. In addition, CUMS mice showed significant reductions of serotonin (5-HT), dopamine (DA), and norepinephrine (NE) in brain prefrontal cortex and hippocampus regions comparing to that in normal control animal group. The results suggested that a successful mouse CUMS model could be established through 5 week continuous treatment. The CUMS model showed the similar biochemical changes in MDD patients.

### **05.03.03 An Ecological Survey of a Freshwater Bog in South-Central Oklahoma**

**David, Bass** *University of Central Oklahoma*

**Kinsey, Tedford** *University of Central Oklahoma*

An unusual wetland pond, known as a quaking bog, is located on the Oka' Yanahli Preserve in Pontotoc County. A quaking bog possesses a false-bottom composed of a thick layer of vegetation floating beneath the water surface. There is little known about these ecosystems, and none have been described in any published studies in Oklahoma. The objectives of this study included determining basic water quality, identifying macroinvertebrates present, estimating population sizes, calculating species diversity, and comparing macroinvertebrate samples from different areas of the bog. In June of 2014, water samples were collected from the pond to determine basic water quality parameters. Six biological samples were collected using a petite Ponar bottom grab in a transect (center, middle, outer) across the bog. These samples were preserved and returned to the laboratory for sorting, identification, and counting. Results have shown high water quality exists in the wetland. There were 28 different taxa identified out of the 2,930 macroinvertebrates collected, 334 of the organisms being insects. Annelids and fingernail clams were the most abundant taxa. When comparing sampling areas, the center contained the largest number of individuals and middle samples had the greatest diversity. Shannon-Wiener Species Diversity results are as follows: center (1.67), middle (2.46), outer (2.11), and collectively (1.76).

#### **05.03.04 Nasal Carriage of Staphylococcus aureus and Methicillin Resistant Staphylococcus aureus (MRSA) in College Students**

**Jonathon,Johnston** *University of Central Oklahoma*

**Mohamed,Fakhr** *University of Tulsa*

**Rachael,Baalman** *University of Central Oklahoma*

**Yuhang,Shang** *University of Central Oklahoma*

Nasal carriage of Staphylococcus aureus has been identified as a significant risk factor for subsequent infections and is a target for decolonization approaches; it is critical to understand the epidemiology of S. aureus and methicillin-resistant Staphylococcus aureus (MRSA). Investigation into the dynamics of MRSA carriage will be valuable in the development of strategies to control this emerging pathogen. The efficacy of these methods may be dependent on the load and type of S. aureus present in the nose. The hypothesis is that carriage levels and types of S. aureus and MRSA are highly variable in a healthy student population. To test this hypothesis, nasal swab specimens were collected from University of Central Oklahoma students and cultured onto blood agar plates for quantitative analysis. Methicillin resistance was determined with cefoxitin disk diffusion and PCR for mecA. Clonal similarities were determined by PCR amplification of the spa gene and sequence typing. Staphylococcus aureus prevalence was 21.5%, with a geometric mean of 1,820 Cfu/swab. MRSA prevalence was 2.4%, with a geometric mean of 412. spa typing results showed a variety of sequences, supporting the hypothesis.

#### **05.03.05 Green Tea Extract antioxidant inhibits tension generation by Dupuytren's disease myofibroblasts**

**Chelsea,Spencer** *University of Central Oklahoma*

**Melville,Vaughan** *University of Central Oklahoma*

Dupuytren's Disease is a deforming disorder of the palmar fascia due to myofibroblast contraction. Epigallocatechin gallate (EGCG) is a chemical extracted from Green Tea. Antioxidants such as EGCG have been shown to inhibit myofibroblast-like cells. I hypothesize that EGCG will suppress the myofibroblasts phenotype and contraction of Dupuytren's Disease fibroblasts. To test this, I grew fibroblasts on coverslips to study cellular structure and in collagen lattices to study contraction ability. In order to mimic in vivo environments, I added TGF- $\beta$  to promote myofibroblast formation. To reverse TGF- $\beta$  effects, a dose response curve of EGCG was added to TGF- $\beta$  treated cells. EGCG inhibited collagen lattice contraction in a dose dependent fashion. It seems that EGCG reduced the number of cells stained with Immunofluorescence staining procedure, and previous studies have shown that contraction is reduced when fewer cells are present. This study suggests that myofibroblasts can be reduced by the addition of EGCG, thus providing a possible treatment for Dupuytren's Disease.

### **05.03.06 How Staphylococcus Aureus Biofilm and Planktonic Secreted Products Affect Myofibroblast Differentiation**

**Alain, Komeni** *University of Central Oklahoma*

**Melville, Vaughan** *University of Central Oklahoma*

**Preston, Hall** *University of Central Oklahoma*

**Robert, Brennan** *University of Central Oklahoma*

Wounds often become chronic by staying in the inflammatory stage of the healing process for an excessive time periods. The ability of fibroblasts to differentiate into myofibroblasts is key for the normal progression of wound healing. Recent experimental evidence has shown that products secreted by planktonic *S. aureus* and *S. aureus* biofilms differentially affect viability and inflammatory cytokine production by human fibroblasts, along with human keratinocytes. Our goal was to determine whether media conditioned by *S. aureus* affected myofibroblast differentiation by utilizing 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 media-only control. We found that products secreted by *S. aureus*, especially planktonic *S. aureus*, significantly decreased myofibroblast differentiation in three separate experiments which suggests that wound healing won't progress to the myofibroblast phase if the cells are being inhibited. Bacterial biofilms are currently difficult to treat, so being able to promote myofibroblasts may aid the healing of chronic wounds. These findings should also spark future studies related to wound healing.

### **05.03.07 Evaluating Genetic Diversity and Structure of a Mediterranean House Gecko (*Hemidactylus turcicus*) Invasion at the University of Central Oklahoma**

**Allyson, Fenwick** *University of Central Oklahoma*

**Audrey, Matheny** *University of Central Oklahoma*

**Laura, Kimmel** *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 house 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 20 buildings over 18–52 years. Our hypothesis, based on previous work on this species in other regions, is that each building hosts a genetically isolated population of geckos and that populations will show an overall pattern of decreasing genetic diversity with increasing geographic distance from the original site of introduction. To date we have collected over 100 individuals from ten buildings across campus. We are optimizing amplification of microsatellites; genotyping these extremely variable loci should help us analyze genetic diversity and genetic structure over short time periods and restricted geographic ranges. Our results will help inform studies of invasion genetics and of evolution over very short geographic distances.

### **05.03.08 Algae: The Key to Unlocking Multicellularity Abstract**

**Joseph-Michael,Fields** *Langston University*

Cancer, a devastating disease that results from the breakdown in the pathways that lead to multicellularity potentially making genes associated with multicellular evolution defective. This suggests that cancer results from errors in the cell cycle regulatory pathway. The hypothesis for my project is modifications in the cell cycle regulatory pathway in Volvocine algae has resulted in multicellularity. So, the goal of this research project is to use the Volvocine algae as a model system to study multicellular evolution using candidate genes from the multicellular organism *Gonium pectorale* and transforming them into the unicellular organism *Chlamydomonas*. The methodology to this project was to take cloned candidate multicellularity genes from *Gonium* and functionally test them looking for a gain of function in the *Chlamydomonas* cells. The transformed *Chlamydomonas* cells were then plated, grown, picked and examined under a microscope for evidence of transformation. The *Chlamydomonas* cells that were electroporated with the cell-cell adhesion gene from *Gonium* were successfully transformed; the unicellular *Chlamydomonas* became multicellular with the insertion of the *Gonium* gene. With these results it is possible to further our research by taking the next step and performing a RNA-seq on the transformed multicellular *Chlamydomonas*. Using this we hope to one day transition our knowledge from the algae model system to vastly improve our ability to detect and treat human cancers.

### **05.03.09 Autofluorescence in *C.elegans* can be Used as an Indirect Measure of Pore-Forming Toxin Activity** Laci LeFlore, Brad Ludrick **Southeastern Oklahoma State University**

**Laci,LeFlore** *Southeastern Oklahoma State University*

The nematode *Caenorhabditis elegans* contains lysosome-like gut granules within the intestine that strongly emit blue autofluorescence when exposed to ultraviolet light. We believe this can be used as an indirect measure of intestine damage caused by pore-forming toxins by measuring intestinal autofluorescence intensity using ImageJ and Excel software. We used transformed *E. coli* that can be induced with IPTG to produce the pore-forming toxin, Cry5B. Cry5B is a native crystal protein of certain *Bacillus thuringiensis* strains and is toxic to *C. elegans*. *C. elegans* and transformed *E. coli* were cultured according to standard techniques. Transformed *E. coli* without the pore-forming toxin insert were used as the control. Using a single-well assay (96-well plate), synchronized L4 individuals were placed in wells containing *E. coli* bacteria (toxic and control) and S medium. Individuals were grown for 24 hours at RT, immobilized with 500 mM ethyl alcohol, and then examined under a fluorescent microscope. Based upon our results, fluorescence intensity of the intestine is greatly reduced in *C. elegans* fed transformed *E. coli* (toxic). These results indicate that intestine damage caused by pore-forming toxins may be quantified using fluorescence intensity as an indirect measure.

### **05.03.10 STUDIES OF BIOFILM FORMATION BY BACTERIA ISOLATED FROM DRINKING FOUNTAINS**

**Taylor, Waugh** *Northwestern State University*

This research was done to identify and determine the presence of bacterial species in drinking water fountains, and to determine if these species were potentially pathogenic, and could actively form biofilms with other species. Once isolation was achieved the different species of bacteria were grown in different combinations of two and growth was measured and compared to the growth of each of the species individually. Bacterial species were isolated and identified by using standard isolation and identification protocols. The amount of growth was measured by spectrometry. The results conclude that different species react differently with other species. Synergistic (to make biofilms) and antagonistic relationships were found to be present with certain mixtures of species. Most individual species identified during the study are known to be pathogenic species.

### **05.03.11 Chemical Composition of Femoral Gland Secretions in Male Collared Lizards**

**Abigail, McGee** *University of Central Oklahoma*

**F., Albadily** *University of Central Oklahoma*

**Thomas, Jourdan** *University of Central Oklahoma*

**John, Bowen** *University of Central Oklahoma*

**Troy, Baird** *University of Central Oklahoma*

**Wayne, Lord** *University of Central Oklahoma*

Chemical signals function for intraspecific communication in numerous lizard species that have well developed chemosensation using their vomeronasal organs. Other species, such as eastern collared lizards (*Crotaphytus collaris*), have highly developed visual signaling, but also produce secretions from their femoral glands, suggesting that both chemical and visual signals may be involved in intraspecific communication. We used gas chromatography-mass spectrometry to analyze the femoral gland secretions of male collared lizards (N = 44) to determine the chemical composition and compare it with that in the secretions of lizards having highly developed chemical-based communication. Six of the compounds in *C. collaris* secretions were similar to those in a visually oriented congener, as well as those in other lizard taxa that rely heavily on chemical signaling. Future studies will examine the potential associations among these compounds and the ability of male collared lizards to signal competitive ability to rival males and attributes of males that promote high reproductive success.

### **05.03.12 An antioxidant 3,4',5-trimethoxybenzophenone inhibits growth of human hepatocellular carcinoma cells**

**Christopher,Patton** *University of Central Oklahoma*

**Hari,Kotturi** *University of Central Oklahoma*

**Pritika,Khadka** *University of Central Oklahoma*

Liver diseases affect about 30 million Americans (American Liver Society). Hepatocellular carcinoma (HCC) is the third leading cause of cancer-related death worldwide. Risk factors for HCC include viral infection such as hepatitis B and hepatitis C, alcoholic hepatitis, non-alcoholic fatty liver disease, and liver cirrhosis. Current therapies available for treating HCC include Sorafenib, surgical resection, transcatheter arterial chemoembolization, radiofrequency ablation, ethanol ablation, combination drug therapy, and liver transplantation. However, these approaches are inadequate in controlling the progression of HCC and there is a growing need for inexpensive new therapeutic agents with minimal side effects to humans. Human hepatoma cell line (FCA4 cells) that harbors a subgenomic selectable HCV replicon was used to study the effect of 3,4',5-Trimethoxybenzophenone (TMBP). Western blot was conducted to analyze the viral NS5B polymerase level in FCA4 cells treated with varying concentrations of the drug. The effect of TMBP on cell proliferation/viability was assayed using MTT method. TMBP was found to be highly effective in reducing NS5B polymerase level at 2.5  $\mu$ M, which was found to be below its IC50 as determined by the MTT assay. Our results indicate that TMBP possesses anti-cancer and anti-viral properties.

### **05.03.13 Population Genetics and Structure of Local Invasion of Red Imported Fire Ants (*Solenopsis invicta*) at the University of Central Oklahoma**

**Allyson,Fenwick** *University of Central Oklahoma*

**Audrey,Matheny** *University of Central Oklahoma*

**Laura,Kimmel** *University of Central Oklahoma*

This study looks at the genetic variation, population structure and geographic dispersal of the red imported fire ant (*Solenopsis invicta*) on the University of Central Oklahoma campus. Studying this local invasion can reveal patterns and trends that can be used to mitigate future invasions. In October of last year, biologists spotted red imported fire ants spreading across campus within a time span of two weeks. Students subsequently sampled colonies on campus mapping over 500 nests and took samples of workers from >20 colonies. The identification of red imported fire ants was confirmed by morphological techniques. We are evaluating the genetic diversity using published microsatellite loci and population genetic techniques. We have optimized the microsatellites and will soon genotype them. Genetic variation is expected to be low if there was a single introduction and higher if there were multiple introductions. Additionally, the social structure of the colonies was determined using the Gp-9 locus. Preliminary data show most colonies are polygyne (multiple queen) with 2 possible monogyne (single queen) colonies. Our results support previous work suggesting polygyne colonies are more successful invaders because they utilize colony budding dispersal. Future research will analyze microsatellite data and expand the study area.

### **05.03.14 The Effects of Staphylococcus Aureus Secreted Products on Fibroblast Tension Generation**

**Melville, Vaughan** *University of Central Oklahoma*

**Pratiksha, Kshetri** *University of Central Oklahoma*

**Robert, Brennan** *University of Central Oklahoma*

Chronic wounds are often characterized by persistent inflammation. It provides 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 biofilm in chronic wounds is known, its pathogenesis is still unclear. Chronic wounds may be affected directly by the biofilm or through interaction with secreted products of the biofilm bacteria. Secretions by planktonic bacteria may also play a role in chronic wound pathology. Concurrent studies in our lab have shown that myofibroblast proliferation and differentiation are affected by products secreted by *S. aureus* biofilm and planktonic forms. Therefore, we hypothesized that biofilm and planktonic conditioned medium of *S. aureus* would affect fibroblast ability to generate tension in a stress-relaxed collagen lattice. Tension generation is one of the important factors in wound closing by myofibroblast. Control and TGF- $\beta$  treated lattices were cultured in the presence or absence of *S. aureus* biofilm and planktonic conditioned medium. TGF- $\beta$  treated lattices were too contractile and self-released prior to maturation. The mature control lattices showed the greatest contraction followed by biofilm with less contraction. The planktonic treated lattices showed no contraction. Whether the reduced contraction was correlated with reduced cell number and/or myofibroblast presence is currently being investigated.

### **05.03.15 Phylogeography of Sonoran mud turtles (*Kinosternon sonoriense*) in the Madrean Sky Islands**

**Laura, Kimmel** *University of Central Oklahoma*

**Michelle, Haynie** *University of Central Oklahoma*

**Paul, Stone** *University of Central Oklahoma*

Phylogeography is the study of the geographic distribution of genetic lineages. When well-planned and executed, phylogeographic analyses can show historical patterns of gene flow and genetic isolation. Naturally fragmented freshwater habitats often create replicated natural experiments well-suited to phylogeographic study. The often subdivided topography of individual mountain ranges in the Madrean Sky Islands in New Mexico and Arizona make the habitat ideal for studying genetic variation of the Sonoran mud turtle at three levels: within drainages, among drainages, and among mountain ranges. We have obtained sufficient samples (between 17 and 40 per population for three populations per range) from the Peloncillo, Galiuro, Huachuca, and Pajarito Mountains. Sequencing of the mitochondrial DNA D-loop is ongoing. After DNA extraction from blood samples, we amplify and sequence 400 bp of the left domain of the mitochondrial DNA D-loop and 400 bp of the right domain of the D-loop. Future research will focus on completing sequencing and using sequences to examine the genetic structure of Sonoran mud turtles.

### **05.03.16 METHODS FOR TESTING FOR INSECTICIDE EFFECTIVENESS**

**Luvey,Deatherage** *East Central University*

METHODS FOR TESTING FOR INSECTICIDE EFFECTIVENESS Authors: Luvey Deatherage University of Scholar: East Central University Location of Research: East Central University, Ada, OK, USA Funding: OK-LSAMP, NASA Mentors: T. Cluck, and C. Biles. East Central University Our laboratory is interested in testing the effectiveness of insecticides using *Drosophila melanogaster* as a test organism. One suggested method of applying insecticides was to inject small quantities into a fly. This method was rejected because exposure in nature using injection was unlikely, and we did not have the equipment to perform injections. Five other procedures were developed and tested for the most efficient analysis of insecticide effectiveness. Exposure of flies to insecticide-impregnated strips of filter paper was the best. However, larval exposure to insecticides in food also provided a good measure of efficacy for survival to adulthood when insecticides are present in the food supply.

### **05.03.17 Reporter Systems and the use of Transgenic Plant Technology**

**Kevin,Wang** *Northeastern State University*

**Yves Saint,Hall** *Northeastern State University*

Yves Saint Damien Hall Mentor Dr. Kevin Wang Natural Science Department, Northeastern State University at Broken Arrow 3100 East New Orleans Street, Broken Arrow, OK 74014 Famine, pestilence, world hunger, and disease eradication. Problems that have been plaguing our world since biblical times can be eradicated through the use of transgenic plants. To address these, we used indicator proteins such GFP (Green Fluorescent Protein) and GUS ( $\beta$ -Glucuronidase), to show successful expression. GFP gene was transiently expressed in the leaves of tobacco plants. It is a convenient method and we could check for indication at 4 to 5 days after infiltration. GUS could be stably introduced to the plants. GUS positive blue indicated that we successfully received transgenic state in plants. Transient expression technique has been used in molecular pharming and are currently used in the fight against Ebola. Using the plant as a biofactory can help so many places in so many ways, not to mention eradicating current and future disease. Today, Ebola and the flu, tomorrow HBV and HIV.

### **05.03.18 Purification and Quantification of tadA enzyme in Escherichia coli**

**Baylee,Tatum** *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 *Escherichia 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.



### **05.03.19 Tree Characteristics, Woody Biomass, and Carbon Sequestration Estimates on the University of Central Oklahoma Campus**

**Chad,King** *University of Central Oklahoma*

**Daniel,Bond** *University of Central Oklahoma*

**Shelbi,Richett** *University of Central Oklahoma*

University campuses across the world have led efforts to quantify sources and sinks of carbon to attain carbon-neutrality in light of climate change. One of the leading approaches to identifying carbon sinks is quantifying tree characteristics that are present on the campus. Woody vegetation function in sequestering carbon via photosynthesis and also storing carbon in their biomass. The objectives of our research included: 1) quantifying structural characteristics of trees on the University of Central Oklahoma (UCO) campus; 2) estimating total and genus-level above-ground biomass; and, 3) estimating total and genus-level annual carbon sequestration. We collected five forestry measurements on 543 trees located on the UCO campus between July and November 2014. We estimated biomass and carbon sequestration using the Center for Urban Forest Research (CUFR) Tree Carbon Calculator program. Of the 543 trees measured at UCO, oak (*Quercus* spp.) was most common (n =122), however *Juglans* spp. and *Carya* spp. had the largest mean diameter ( $\bar{x}$  = 68.6 cm, S.E.  $\pm$ 5.88) and mean height ( $\bar{x}$  = 15.2 m, S.E.  $\pm$ 1.01). Preliminary analysis indicates the oak group sequesters 15.9 metric tonnes C yr and currently stores 70.7 metric tonnes C in above-ground woody biomass. This result highlights the relatively low carbon sequestration rate compared to similar results for oak at other sites, globally. Additional carbon sequestration results will be presented for other species found on

### **05.03.20 Potential of an Old-Growth Cross Timbers Forest at Lake Arcadia, Oklahoma**

**Chad,King** *University of Central Oklahoma*

**Shey,Ramsey** *University of Central Oklahoma*

The Cross Timbers is an oak-dominated ecotone located between the Eastern Deciduous Forest and the Great Plains in the south-central United States. Previous research has modelled potential sites in Oklahoma that may contain old-growth Cross Timbers forest; one of the sites highlighted by the model was the Arcadia Lake region in central Oklahoma. The objective of our research was to investigate the structure and historic dynamics of the Cross Timbers forest at Lake Arcadia. Increment cores were collected from dominant and co-dominant tree species to determine age structure. Remnant wood was opportunistically collected to determine if fires were historically present at the site. Results demonstrate several *Quercus stellata* (Wangenh.) that are the oldest trees, dating to the mid-19th century. Remnant wood provided evidence of 10 fires that occurred between 1900 and 1950 based on fire-scar analysis. Ignition of these fires was likely related to early Euro-American settlement in the area. The contemporary structure of the forest at Arcadia Lake suggests an increase in mesophytic species density that is a product of fire suppression, similar to other studies of forests in the Cross Timbers. Continued analysis of forest structure and dynamics will provide a deeper understanding of forest succession and old-growth status at Lake Arcadia.

### **05.03.21 The Roles of Body Condition and Onset Date on Annual Clutch Production in Female Collared Lizards**

**Connor, McGill** *University of Central Oklahoma*

**Rory, Telemeco** *University of Washington*

**Troy, Baird** *University of Central Oklahoma*

In some lizard and snake species, females produce multiple successive clutches throughout a protracted reproductive season. Previous studies on 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 number of clutches produced annually. Alternatively, the length of the activity season may also play a role in determining the number of clutches, because development of each clutch requires adequate time and last clutches must be laid early enough that hatchlings can grow to a size allowing them to survive the impending winter. We are testing these predictions by examining the number of clutches produced by individual collared lizard females at the Arcadia Lake site throughout the 2007-2014 reproductive seasons, a period over which the onset of reproduction and clutch production varied markedly.

### **05.03.22 Identifying the enzyme involved in hypotaurine to taurine biosynthesis**

**Roxanna, Grove** *University of Central Oklahoma*

**Steven, Karpowicz** *University of Central Oklahoma*

Taurine is the most abundant amino acid-derived molecule in the cell and is a product of cysteine metabolism. It is ubiquitous in animal tissues, but more concentrated in the brain, liver, retina, and adipose cells. It is essential for many biological processes, such as neonatal development, though its exact role is unclear. The nature of the biological reaction of the reactant hypotaurine to the product taurine is still unknown. The goal of this project is to identify the gene product that performs this biochemical reaction. Gene co-expression analysis of liver cell mRNAs has revealed several potential candidate genes. The candidate proteins will be expressed and tested for catalysis of hypotaurine to taurine using HPLC and o-phthalaldehyde (OPA) as a colorimetric derivatizing reagent.

### **05.03.23 Modeling the affect of platelets on blood clot degradation.**

**Brittany, Bannish** *University of Central Oklahoma*

**Hyunjong, Kim** *University of Central Oklahoma*

The objective of this research is to understand how the rate of blood clot degradation is affected by tPA and platelets. We hypothesize that degradation is affected by tPA and platelets which act as obstacles and that more obstacles reduce the degradation rate. We use a mathematical model to run computational experiments (using the Fortran and MATLAB programs) to obtain results. We create snapshots which depend on the configuration of the obstacles with the same tPA concentration. The result is that for a fixed tPA concentration, the degradation rate is faster as the obstacles are placed further from the starting point of tPA. On the other hand, if we put the obstacles closer to the initial point of tPA, the degradation rate is slower.

### **05.03.24 Characterization of Three Major Histocompatibility Complex Class II Loci in *Neotoma albigula***

**Lindsay,Stone** *University of Central Oklahoma*

**Michelle,Haynie** *University of Central Oklahoma*

The major histocompatibility complex (Mhc) is an important component of vertebrate immune systems. Genetic analysis at Mhc loci can provide information on susceptibility to certain viral strains. *Neotoma albigula* (white-throated woodrat) has been associated with at least three distinct strains of arenaviruses, suggesting an interesting coevolutionary history between the host and virus. In this study, we have been screening three Mhc class II loci to detect genetic variation within *N. albigula* subpopulations in Arizona. We hypothesize that specific alleles for each locus will be positively correlated with disease susceptibility. Initially, we screened two loci using capillary electrophoresis-based single strand conformational polymorphism (SSCP) analysis. Using this method, we found moderate levels of genetic variation at the loci and little correlation between disease susceptibility and alleles. Due to SSCP optimization issues, we have added a third locus and are sequencing the alleles to confirm their identity.

### **05.03.25 Comparison of Acid Production and Growth Rate of Selected Gram Negative Bacteria and Yeasts in Different Carbohydrates**

**Erin,Little** *Northwestern State University*

Several species of gram negative bacteria are known to ferment different types of sugars, including maltose, sucrose, dextrose, and many other. However, the amount of acid produced by different bacteria varies greatly depending on the type of carbohydrate that is present. In this experiment, five gram negative species of bacteria: *Escherichia coli*, *Enterococcus faecalis*, *Proteus vulgaris*, *Proteus mirabilis*, *Enterobacter aerogenes*, and two species of yeast, *Candida albicans* and *Saccharomyces cerevisiae*, were compared to see the growth pattern and acid production in various carbohydrate media. Results show that *Enterococcus faecalis*, *Escherichia coli*, and *Proteus vulgaris* fermented sugars into acid more efficiently compared to the rest of the microbes used in this experiment. The pH of the acid produced by the bacteria is directly related to the growth rate of individual species.

### **05.03.26 Molecular Farming: Biodegradable Plastics**

**Miko,Atkins** *Northeastern State University*

My research project is over biodegradable plastics. Recycling or "going green" is a big issue right now because pollution is a big problem and it affects the earth's land, oceans, animals, and humans. Each year in the US alone we throw away billions of plastic items whether it's a water bottle or a plastic bag and it can take these plastics thousands of years to degrade. A standard plastic water bottle, plastic bag or plastic anything contains harmful toxins such as BPA. BPA is a potentially harmful chemical that is widely used to make many different plastics including those that hold foods and beverages. Biodegradable plastics are a smarter choice and they are non-toxic. There are several benefits to using biodegradable plastics including but not limited to: they take way less time to break down, they are renewable, and they are better for the environment. In our efforts to reduce pollution and keep our mother earth healthy, it is now that through molecular farming scientists are able to produce biodegradable plastics that are eco-friendly.

### **05.03.27 Oriental Medicine: The Five Elements**

**Ashley, Hopkins** *Northeastern State University*

The Five Elements of Oriental Medicine are known as wood, fire, earth, metal and water. The elements are a major focus in oriental medicine. It is a theory, when all the elements are in balance, the being is in harmony. The elements work to balance one another out. If one element is out of balance, the corresponding element is also out of balance. The elements each represent different sources. The Wood Element represents the liver and gallbladder and its corresponding element, wood, represents the Spleen and Stomach. Fire represents the heart, small intestines and pericardium and its corresponding element, metal, represents the large intestines and lungs. The last element, water, represents the bladder and kidneys. When one of the elements are out of sync, there are some "illnesses" that one may experience, depending on the element that is not in balance.

### **05.03.28 A Comparison of the Nestling Provisioning Rates of Male and Female Swainson's Warblers (*Limnothlypis swainsonii*)**

**Darby, Hanna** *Northeastern State University*

**Mia, Revels** *Northeastern State University*

The young of altricial species require parental care to develop and survive. In birds, the nestlings remain in the nest for some time and the parents must bring them food. Provisioning rates, the rate at which a parent brings food to its nestlings, are a critical part of the natural history of birds with altricial young. Little is known of the natural history of the Swainson's Warbler, *Limnothlypis swainsonii*, including information about provisioning rates. Nests were located and filmed on the Little River National Wildlife Refuge in southeastern Oklahoma. Videotapes were viewed and the following behaviors were noted: frequency and duration of visits by each parent to the nest, frequency of parental provisioning of the nestlings, and the number of nestlings fed during each trip. Provisioning rates were compared within early, middle, and late developmental stages. We found that the overall provisioning rates increase as the nestlings age, with the average female rate increasing disproportionately to the average male rate. This overall feeding increase is consistent with the idea that as the nestlings grow, they require more food to meet higher metabolic demands.

### **05.03.29 Chlamydia trachomatis Recruits Protein Kinase A and Protein Kinase A Substrates During Infection**

**Amanda, Behar** *Oklahoma State University*

The obligate intracellular pathogen, *Chlamydia trachomatis*, usurps many host cell-signaling pathways from within a membrane bound vacuole, deemed an inclusion. *C. trachomatis* has been previously shown to recruit and activate Src family kinases at discrete microdomains on the inclusion membrane. These microdomains are theorized to be regions for additional kinase activity. This study investigated the recruitment of Protein Kinase A (PKA) and PKA phosphorylated substrates to the inclusion membrane microdomains during *C. trachomatis* infection. PKA was found to be sequestered to the inclusion membrane microdomains and colocalizing with active Src family kinases at mid to late infection. Phosphospecific antibodies to PKA phosphorylated substrates demonstrated that PKA substrates also colocalized with Src family kinases. Pharmacological inhibition of PKA activity resulted in a loss of PKA phosphorylated substrate recruitment and localization, while PKA recruitment remained unaffected. These studies provide novel insights into the diverse role of PKA during *C. trachomatis* infection and suggest that the active Src family kinase rich microdomains function as highly active kinase regions on the inclusion membrane surface that may be involved in many essential chlamydial processes.

### **05.03.30 Chlamydia trachomatis Manipulates Protein Kinase C During Infection**

**Brooke, Romine** *Oklahoma State University*

*Chlamydia trachomatis* is the most commonly reported bacterial infection in the United States and the leading cause of sexually transmitted infections worldwide. Infection by *C. trachomatis* can lead to severe medical complications in women, including pelvic inflammatory disease; yet, despite these concerns, there are fundamental gaps in our understanding of *Chlamydia* pathogenesis, particularly with regards to the mechanisms used to manipulate host proteins for intracellular survival and growth. Our central hypothesis is that *C. trachomatis* manipulates and recruits host signaling proteins, such as Protein Kinase C (PKC). We have shown that *C. trachomatis* manipulates PKC during infection, recruiting multiple isoforms of PKC to the chlamydial parasitophorous vacuole, the inclusion, during infection. Phosphorylated PKC co-localizes with activated Src family kinases at discrete microdomains on the inclusion membrane. PKC substrates were also found to localize to the entire periphery of the *C. trachomatis* inclusion. The recruitment of PKC and PKC phosphorylated substrates suggests that PKC may play a very important role during *C. trachomatis* infection. These studies provide novel insights into the diverse mechanism by which *C. trachomatis* manipulates host cell processes for survival and infection.

### **05.03.34 Unconsciously Saying No**

**Bailey, Craig** *Northwestern State University*

Westermarck theorized that nature would select out breeders for a successful evolutionary outcome. As such he hypothesized that there is a natural dislike to mating between persons living closely together from childhood. Taking this hypothesis into consideration, we looked at the incest taboo in a little different way; this experiment looked at the dating patterns in small rural schools compared to large schools. It has been observed that in small schools (student body size less than a hundred) where adolescents grew up in close association with each other, that they do not date each other within their school, they tend to date other adolescents from small schools in the surrounding areas. Adolescents in smaller schools see the kids they grew up with, essentially as brothers and sisters. They do not see their fellow peers as dateable. In other words small school adolescents see this as a form of inbreeding. Surveying adolescents from rural schools in Northwest Oklahoma served as the source for collecting data. As a result of the survey a majority of students currently dating or have previously dated, had dated someone from another surrounding school. However, a majority of the students said they would think about dating someone from their school.

### **05.03.35 Golden Rice: Genetically Modified Crop That Could Benefit Vitamin A Deficient Populations in Developing Countries**

**Brian,Clark** *Northeastern State University*

Paper review: Genetically modified (GM) crops have the potential to alleviate nutritional deficits in developing nations that subsist on a staple cereal and have few dietary sources of micronutrients. The modification of crops and their associated traits has been conducted by humans for many generations through selective breeding, but with the employment of GM technology it has become possible to convey traits that could not otherwise be introduced into a species as native plants do not contain the variability for these genes. Vitamin A deficiency (VAD) is a problem that affects millions of people and can lead to blindness as well as death. The development of Golden Rice offers a solution to reduce the pervasiveness of VAD by creating a strain that incorporates biosynthetic pathways for beta-carotene, the precursor of vitamin A. Since the first publication on Golden Rice in 2000, the micronutrient content has increased to meet dietary requirements and has been shown as a sound source of vitamin A especially for those in the most rural settings that cannot receive supplementation or fortification of vitamin A.

### **05.03.36 Cryptic Species and Contact Zones: Using Molecular Markers to Assess Geomys Distributions in Oklahoma**

**Cristina,Coffman** *University of Central Oklahoma*

**Michelle,Haynie** *University of Central Oklahoma*

**Rebecca,Dimanche** *University of Central Oklahoma*

The aim of this project is to utilize genetic markers to address two questions concerning members of the genus *Geomys* (pocket gophers) found in Oklahoma: 1) What are the distribution boundaries of *G. bursarius* (plains pocket gopher) and *G. breviceps* (Baird's pocket gopher) in central Oklahoma and 2) Is *G. jugossicularis* present in the Oklahoma panhandle? The mitochondrial DNA cytochrome b (cytb) gene, the Y chromosome SmcY gene, and a suite of 14 microsatellite markers will be used to identify specimens collected in central Oklahoma and the panhandle. The geographic boundary between *G. bursarius* and *G. breviceps* in central Oklahoma is undefined, though Heaney and Timm proposed a boundary based on morphological data and a known contact zone has been identified in Norman. Testing will be done to determine if the boundary suggested by morphological data is supported by genetic data, and if additional contact zones exist along the boundary of the two species. Genetic data obtained from samples collected in central Oklahoma will be compared to samples collected from within the well-defined ranges of the two species (western Oklahoma – *G. bursarius*; southeastern Oklahoma – *G. breviceps*) to ensure correct genetic identification and to account for the possibility of hybridization between the two species in central Oklahoma. Additionally, samples collected in the panhandle will be compared to known *G. bursarius* samples to determine if they represent a different spec

### **05.03.37 Effects of Prescribed Fire and Forest Dynamics at an Urban Cross Timbers Forest in Central Oklahoma, USA**

**Carmen,Esqueda** *University of Central Oklahoma*

**Chad,King** *University of Central Oklahoma*

Understanding effects of prescribed fire is essential to the development of forest management practices. In 2011, the Oklahoma Forestry Service began a prescribed fire regime for forest fragments at Lake Stanley Draper located in southeastern Oklahoma City, Oklahoma, U.S.A. Lake Stanley Draper lies within the Cross Timbers ecoregion and is surrounded by urban landscape. One goal of this project is to obtain pre- and post-burn plant species composition for one designated burn unit using permanent fixed-plots (0.01 ha). Pre-burn data has revealed post oak (*Quercus stellata* Wangehn.) and blackjack oak (*Quercus marilandica* Munchh.) as the dominant overstory tree species. Including post and blackjack oak, nine other tree species in the understory and fifteen species at ground level have been identified. Post-burn data will be collected three times following prescribed burning to determine fire effects on residing plant species. This study is important for foresters managing the regime at Lake Stanley Draper by evaluating burn effectiveness. Effects of prescribed fire at this site will also benefit the scientific community because these results have yet to be determined for urban forest fragments of the Cross Timbers.

### **05.03.38 Comparison of Work Performance in Men with Traumatic Transtibial Amputation and One Male at Risk for Residuum Injury**

**Eugene,DeLoach** *Langston University*

Transtibial amputations (TTAT) are frequently performed in individuals who have sustained a traumatic event. The majority of adults with a traumatic transtibial amputation are healthy, male, and of working age. Nevertheless, residuum pain and injury suffered during work-related activity (WRA) are chief reasons adults with amputation are overly represented among the unemployed. The purpose of this study was to compare self-paced gait, brisk gait, carrying, and lifting in healthy working adults to a working adult at risk for residuum injury. A cross-sectional study design was used to assess consenting men (25-55 yrs) with unilateral TTAT. The subjects completed a Prosthetic Evaluation Questionnaire (PEQ) and Locomotor Capacity Index survey. During 2-minute self-paced walk, 2-minute brisk walk, floor-to-knuckle lifting, and 25-ft carrying tests, single limb support, cadence, step length, and stride length were recorded concurrently with perceived pain and exertion. Data were tabled and graphed for analysis. Data collected in each WRA indicated that the "at-risk" subject demonstrated greater single limb support on his residual limb than the group at a brisk walking pace and less difference in speed and stride length while carrying a weighted test box. Overall, the "at-risk" subject operated at a comparatively lower performance level. WRA capacity, specific gait parameters, anthropometrics, PEQ subscales are proposed measures to test in men for residuum inj

### **05.03.39 Use of Jasmonic Acid and Salicylic Acid to Control Harmful Nematodes in Soybeans**

**Felicia,Osburn** *University of Central Oklahoma*

**Ibrahim,Taher** *University of Duhok*

**James,Bidlack** *University of Central Oklahoma*

**Jane,Jarshaw** *University of Central Oklahoma*

**Joshua,Faw** *University of Central Oklahoma*

**Michaela,Metts** *University of Central Oklahoma*

**Michelle,Littlefield** *University of Central Oklahoma*

**Winifred,Zajac-McConaghy** *University of Central Oklahoma*

**Matheus,Almeida** *University of Central Oklahoma*

This experiment was conducted to determine if jasmonic acid, salicylic acid, 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. Chemicals were sprayed 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, and number of nematodes present for each treatment. In general, salicylic acid increased the weight of some soybean yield components in both the nematode infected and non-infected treatments. These results suggest that salicylic acid could be used to increase soybean yield, particularly when nematodes are present.

### **05.03.40 Recent Approaches in Producing Marker-Free Transgenic Plants**

**Taylor,Skorupski** *Northeastern State University*

Recent Approaches in Producing Marker-Free Transgenic Plants Taylor Skorupski Mentor: Dr. Kevin Yueju Wang Molecular & Cellular Biology Laboratory, Department of Natural Sciences Northeastern State University at Broken Arrow 3100 East New Orleans Street Broken Arrow, OK 74014 Abstract: Today, many consumers are worried about the process of genetic modifications in concerns to our food. One of the many techniques that are used in genetically modifying our plants is by the insertion of a selectable marker such as an antibiotic resistance or herbicide resistance gene. These selectable marker genes are used to easily and more readily screen transgenic plants. Since many consumers are unaware of the benefits and fear genetically modified organisms, several techniques have been at play in order to remove the selectable marker gene. These techniques include: co-transformation, transposition, homologous recombination, and site-specific recombination. These techniques use strategies such as excising the selectable marker, in other words cutting it out of the DNA or simply separating the selectable marker from the wanted gene in the early transformation stage. By removing the selectable marker gene, industries have now produced a marker-free transgenic plant. We reviewed recent approaches to produce marker-free transgenic plants.



#### **05.03.41 Evaluation of The Antimicrobial Activity of Cinnamon Oil Nanoemulsions Against Methicillin-Resistant Staphylococcus aureus (MRSA)**

**Cole,Craig** *University of Central Oklahoma*

**Hari,Kotturi** *University of Central Oklahoma*

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

**Maine,Barros** *University of Central Oklahoma*

**Matheus,Almeida** *University of Central Oklahoma*

**Wanderley,Vital** *University of Central Oklahoma*

MRSA has emerged as epidemic crisis in clinical, veterinary medicine and food safety worldwide. The presence of trans-cinnamaldehyde in cinnamon oil has proven to be a powerful antioxidant as well as a powerful antimicrobial agent against an array of microorganisms and their biofilms. These properties provide us with a natural alternative compared to today's standard antimicrobial agents. However, its application is limited due to high minimum inhibitory concentration (MIC) and insolubility in water. One of the strategies in dealing with such hydrophobic compounds is by dispersing them in emulsion droplets. Nanoemulsions of cinnamon oil were prepared via ultrasonication using 10% v/v of oil and surfactant Tween 80 in DI water. Essential oil emulsions prepared by this optimized method exhibited average particle size of 212.92 nm. In this study we investigated the antimicrobial properties of cinnamon oil nanoemulsions against Staphylococcus aureus and MRSA strain ATCC 43300. Antimicrobial activity was investigated using the Broth Microdilution Assay and the Kirby-Bauer Disk Diffusion test. Cinnamon oil nanoemulsion exhibited MBC of 0.078% v/v and zone of inhibition (mm) of 14.5. Antimicrobial nanoemulsion of cinnamon oil offer alternatives to control MRSA in hospital, community and food processing settings. Future studies should explore the antibiofilm effect of cinnamon oil nanoemulsions against MRSA.

#### **05.03.42 How Marker-Free Transgenic Plants Can Help Reduce the Concerns of Consumers**

**Hayley,Fischer** *Northeastern State University*

How Marker-Free Transgenic Plants Can Help Reduce the Concerns of Consumers Hayley Fischer Mentor Dr. Kevin Wang Natural Science Department, Northeastern State University at Broken Arrow 3100 East New Orleans Street, Broken Arrow, Ok 74014 Selectable marker genes are commonly used for the transformation of plants. A selectable marker is a gene with an expression that allows it to correctly identify the cells that have been transformed with the marker gene in order to produce higher quality plants. Transgenetics are used most frequently in plants to add in foreign DNA for resistance to herbicides and to genetically modify them. Normally, selectable marker genes are either antibiotic or herbicide resistant. Unfortunately, many consumers are concerned about human health if we were to ingest the plants that have the genes still intact in them. Biologists have developed numerous different strategies such as: co-transformation, screenable markers, site-specific recombination, transposition and homologous recombination in which a marker gene is eliminated from a chloroplast or nuclear genome after the selection process has occurred. This strategy is called marker-free transgenic plants. A marker-free transgenic plant means the production of transgenic plants without selectable antibiotic or herbicide resistance markers, but instead promotes regeneration after transformation.

### **05.03.43 Prevalence of Tick-borne Diseases in Oklahoma County**

**Matthew, Bryson** *University of Central Oklahoma*

**Robert, Brennan** *University of Central Oklahoma*

Over the past decade, there has been an increase in the cases of tick-borne diseases in the area of Oklahoma County. This study will ascertain whether this increase is due to a higher rate of pathogens in ticks themselves. Tick specimens will be collected from multiple sites around Oklahoma County utilizing dragging techniques. Specimens will be identified to species and the contents of their gut analyzed via Multiplex Polymerase Chain Reaction to determine the presence of seven tick borne pathogens.

### **05.03.44 Utilization of Recombinase Mediated Cassette Exchange for Proper GMO Design And Its Ability To Overcome Environmental, And Health Concerns**

**James, Brown** *Northeastern State University*

**Kevin, Wang** *Northeastern State University*

The mission statement of biotechnology is often said to be to feed, fuel, clothe, and heal the world. While these are a noble set of goals, detractors have voiced much concern regarding the safety of biotech products, especially the use of antibiotic or pesticide resistance genes to select for successfully transformed organisms. While markers of some sort are necessary to produce a GMO product, the possibility that those markers could then transfer to other organisms in the wild, be it a weed or bacterium raises genuine health and environmental concerns. On top of this, markers also produce a barrier to further modification of an organism by the fact that each marker can't be used repeatedly in successive transformations. Here, we reviewed recombinase mediated marker removal which is an efficient method of removing these markers to produce an amitotic marker gene free GMO product.

### **05.03.45 Variability of Pseudomonas aeruginosa Recovered From Cystic Fibrosis Patients in Different Age Groups**

**Elizabeth, Pascual** *Oklahoma State University*

Cystic fibrosis (CF) is the most common autosomal recessive genetic disorder, resulting in faulty chloride ion channels in the lungs. As a result, the lungs are severely compromised with viscous secretions leading to chronic and repeated infections, and the colonization of a diverse microbial community. *Pseudomonas aeruginosa* is one of the primary pathogens in the CF lung and prior research has demonstrated a high degree of phenotypic heterogeneity among adult isolates in comparison to control strains. This study uses subsets of *P. aeruginosa* CF isolates recovered from two patients in each age category: children (under 13), adolescents (13-18), and adults (over 18). Isolates were assayed for a number of virulence factors including surface motility (swim, swarm, and twitch) and production of hydrogen cyanide, biosurfactant, casein protease, and various fluorescent pigments. Isolates from most patients showed a high degree of consistency in producing hydrogen cyanide, fluorescent pigments, protease and biosurfactant. There was, however, variability seen in the different surface motilities of isolates between the different age groups. These results provide insights to the variability of *P. aeruginosa* between age groups and confirm differences between *P. aeruginosa* isolated from newly infected CF patients and those chronically infected for many years.

### **05.03.46 Marker Free Transgenic Plants for a Healthier and Safer America**

**Andrew, Fisher** *Northeastern State University*

Marker Free transgenic plants are in high demand and should be made readily available, unfortunately we are lagging behind. Why should we be forced to consume hazardous foods against our wills and do so unknowingly? Marker genes are used in order to change the genes of plants so they will be resistant to antibiotics and herbicides; these are called genetically modified organisms, GMO. These GMO's can be passed on to the consumer, known as a horizontal transfer, and can interfere with medications and other necessities. This also allows extremely harmful toxins, such as Roundup, to be used on food products that we all eat. For this reason and many more the need for marker free transgenic plants has grown exponentially. In a poll, 91% of those in which were polled wanted GMOs labeled (2012 Mellman Group poll) and 53% of consumers would not buy GMOs (CBS/New York Times poll). Transgenic marker free plants are plants in which are not genetically altered so they do not contain the resistance genes and will not interfere with medications or contain harmful herbicides. In this review, multiple ways of producing plants without GMOs will be discussed.

### **05.03.47 Barcoding the COI Mitochondrial Gene of Culicoides, Biting Midges**

**Diana, Spencer** *Tulsa Community College*

**Jennifer, Nichols** *Tulsa Community College*

**Jordan, Cox** *Tulsa Community College*

**Valerie, O'Brien** *Tulsa Community College*

**Gabriel, Johnson** *Tulsa Community College*

Tulsa Community College Departments of Biotechnology and Biology DNA barcoding has emerged as a powerful tool to supplement traditional methods of taxonomy. Cytochrome c Oxidase Subunit I (COI), a highly conserved 650 base pair segment of the mitochondrial genome, has become a 'global standard' to sort out broad taxonomic diversity in animals and this gene is the target of the study. Biting midges (Diptera: Ceratopogonidae: Culicoides spp.) were collected in two wildlife management areas in Oklahoma. Biting midges are vectors for parasites and pathogens but can be difficult to identify morphologically. Our aim was to investigate a protocol to name the specimen to the species level using molecular biology techniques of the barcoding standard. Our techniques included DNA extraction, PCR amplification, sequencing, and analysis through a multiple sequence alignment and phylogenetic tree formation. We conclude that the identification of as few as five midges could be completed using the COI amplification protocols outlined here.

## **05.03.48 COI Microgenomic Identification and Phylogenetic Evaluation of Arachnida and Insecta Specimens**

**Angela, Fortner** *Tulsa Community College*

**Ashton, Williams** *Tulsa Community College*

**Diana, Spencer** *Tulsa Community College*

**Grant, Chrapla** *Tulsa Community College*

**Lina, Guerrero** *Tulsa Community College*

**Nicol, Whinery** *Tulsa Community College*

The purpose of this study was to compare phylogenetic relationships of Oklahoma Arthropoda organisms through discriminate analysis of the cytochrome c oxidase subunit I (COI) gene. COI codes for an enzyme in cellular respiration, and the 650-base nucleotide fragment on the 5' end of the mitochondrial gene is designated as the universal barcode of life in animals. DNA was extracted, and amplified through polymerase chain reaction with the LCO1490 and HCO2198 primers. Products were quantified, purified, and sequenced. Electropherograms were analyzed and trimmed, with contigs assembled. The data were analyzed using a Maximum Likelihood clustering method; genetic distances were visualized in Jalview. The katydid grasshopper samples were highly conserved. Although our samples were not professionally identified morphologically, they were analyzed through NCBI BLAST with divergences and similarities often verified. Seven of the twenty original samples were phylogenetically placed. Consistent with our expectations, the spiders and insects showed marked genetic similarities with some unexpected aberration.

### **05.03.49 Analysis of Glyceraldehyde-3-Phosphate Dehydrogenase Genes In Oklahoma Plants**

**Alex,DeLeon** *Tulsa Community College*

**Diana,Spencer** *Tulsa Community College*

**Jennifer,Nichols** *Tulsa Community College*

**Jordan,Cox** *Tulsa Community College*

**Samantha,Rice** *Tulsa Community College*

**Tyler,Noble** *Tulsa Community College*

The protein Glyceraldehyde-3-Phosphate Dehydrogenase (GAPDH) is a well-understood enzyme in cellular respiration. The target of this study is the GAPC family of genes that code for GAPDH. Human GAPDH is over expressed in certain types of cancer and appears to have roles in DNA replication and repair, regulation of transcription, programmed cell death, and human neuronal diseases. Our aim was to have a major portion of the GAPC gene sequenced from native plants in northeastern Oklahoma and investigate whether potential phylogenetic placement based upon the sequences of the GAPDH gene would be similar to present taxonomic schemes. We hypothesized that the plants from Asteraceae would be most similar to each other, and the monocot data would exhibit the greatest genetic distance from the dicot data. In this study, DNA from Oklahoma plants was extracted and evaluated. The DNA was amplified and analyzed on an agarose gel. The purified product was ligated into a plasmid vector and then transformed into a bacterium for selection. Plasmids were purified, restriction enzyme digested, and DNA sequenced from positive clones. Following bioinformatics analysis, we conclude that the relationship between the GAPC gene sequences may support traditional phylogenetic placement.

### **05.03.50 Digestive Tract Microbiota Analysis of *Sceloporus consobrinus***

**Alejandra,Mera** *Northeastern State University*

**Cindy,Cisar** *Northeastern State University*

**Mark,Paulissen** *Northeastern State University*

Recent microbiological studies have revealed the abundance and diversity of microorganisms inhabiting the digestive tracts of animals. The gut microbiota of mammals has been well studied, while there has been little study of lizard gut microbiota. In this study, we investigated the gut microbiota of the prairie lizard, *Sceloporus consobrinus*, an insectivorous species. Rectal swab samples were collected from eight prairie lizards captured in Cherokee county in northeastern Oklahoma in the spring and fall of 2014. High throughput 16S rRNA gene sequencing of fecal DNA samples was performed by Research and Testing Laboratory (Lubbock, TX). Bacteria from eight different phyla were identified in the samples: Acidobacteria, Actinobacteria, Bacteroidetes, Cyanobacteria, Firmicutes, Planctomycetes, Proteobacteria, and Verrucomicrobia. A high level of variability in bacterial community composition was observed among individuals. Only Proteobacteria and Actinobacteria were present in all eight lizard samples, ranging from 8-98% and 0.2-8.6% of total bacteria, respectively. The most abundant phylum was Proteobacteria constituting  $47.91 \pm 40.98\%$  of total bacteria, followed by Firmicutes ( $28.56 \pm 24.65\%$ ), and Bacteroidetes ( $21.20 \pm 22.81\%$ ). The remaining phyla were present in low abundance, on average < 3% of total bacteria. These results provide the first data on *S. consobrinus* gut bacterial populations and their diversity.

### **05.03.51 Assessing Black Rail occupancy and habitat along the Texas Gulf Coast**

**Chris,Butler** *University of Central Oklahoma*

**Jeffrey,Tibbits** *University of Central Oklahoma*

The Black Rail (*Laterallus jamaicensis*) is one of the most secretive birds in North America, and little is known about the habitat requirements of Black Rails along the Gulf Coast. Anecdotal observations suggest that this species' population has declined during the last century, and wetland surveys document a substantial loss of breeding habitat. We conducted breeding bird surveys to estimate occupancy and detection probability for the Black Rail in estuarine wetlands. Surveys occurred at Brazoria and San Bernard National Wildlife Refuges from March to May of 2014. We incorporated breeding bird survey data with habitat covariates to identify the variables that influence Black Rail occupancy. This information will be used to improve Black Rail survey protocols and management strategies for Black Rails along the Texas Gulf Coast.

### **05.03.52 Continued Investigations on Use of Plant Pigments in Photovoltaic Cells**

**Baylee,Tatum** *University of Central Oklahoma*

**Ben,Sutter** *University of Central Oklahoma*

**David,Graves** *University of Central Oklahoma*

**Erinn,Murphy** *University of Central Oklahoma*

**James,Bidlack** *University of Central Oklahoma*

**Winifred,Zajac-McConaghy** *University of Central Oklahoma*

This investigation is a continuation of on-going research to find a plant substance which is suitable for the manufacture of practical dye-sensitized photovoltaic cells. During the past year, we focused on evaluation of chloroplast isolations from moss, fern, pine, and deciduous specimens for incorporation into photovoltaic cells. These cells were constructed with glass planes, an anode and cathode; one doped with tin-oxide, with a deposited layer of titanium dioxide, later stained with the plant extract; the other being a similar tin doped glass plane, except coated with graphite. The titanium dioxide coated plane (anode) was stained with a plant extract of chloroplasts and chlorophyll, given a protective seal to protect it from the atmosphere, and then injected with a solution of electrolyte to permit the flow of electricity to the cathode plate. The plates were joined with rubber bands, and offset slightly, to allow the connection of digital voltmeters connected to a computer for data logging. Among treatments applied to the cells, pine demonstrated the highest and most consistent voltage over a 30 day period. An unusual phenomenon, in which cells stopped producing voltage and then demonstrated a spike of voltage many days later, was consistently observed in pine treatments and these data are currently being evaluated.

### **05.03.53 Identification and Characterization of the Bile Salt Sensitivity Mechanism in Escherichia coli**

**James, Bidlack** *University of Central Oklahoma*

**Maximilian, Lyon** *University of Central Oklahoma*

Our previous research has linked the genes *yciS* and *yciM* in *Escherichia coli* to bile salt sensitivity. In this research project we have attempted to isolate and sequence these loci in order to characterize the genes responsible for this phenotype from five strains of bacterium with different genotypes in these regions. One strain is the original strain that demonstrated sensitivity, the second is a resistant sister strain, two are sensitive knock-out mutants, and the last is the parent strain to the others. Our objective was to be accomplished by amplifying the select regions using polymerase chain reaction (PCR) on the selected region to produce high quantities of the DNA in question. The product of these reactions would then be sent to an offsite center for sequencing. The sequences attained from the strains on *E. coli* used in this project would then be compared to the wild type to determine the exact mechanism for the sensitivity observed. Further research will focus on determining if this sensitivity is transferable to other bacterium and if so, which phenotype is dominant. This will be accomplished by transforming a plasmid to contain either the resistant or sensitive gene and inserting it into bacteria with the opposite phenotype. A change in phenotype will indicate which of the two phenotypes is dominant.

### **05.03.54 Recreating Spray Pyrolysis: Thin Film Solar Cell Methodology**

**Hunter, Porter** *University of Oklahoma*

**James, Bidlack** *University of Central Oklahoma*

Spray pyrolysis is an advanced technique used to create thin films on solid media by applying atomized liquids to the surfaces while simultaneously heating them to annealing temperature. Thin film solar cells were created using glass doped with a thin layer of tin oxide. One glass slide was coated with titanium dioxide nanoparticles in an acidic solution and then heated to anneal the titanium, creating an anode. Titanium was applied using three techniques: a cold atomized spray that was then heated to annealing temperature, an atomized spray onto glass preheated to annealing temperature, and a hand-based doping method using a template acting as a control. Cathodes were created by deposition of graphite onto other tin-doped slide. Cells were then assembled by loading an iodine electrolyte (KI/I<sub>2</sub>) solution between the anode and cathode and held together using cyanoacrylate glue. Cells were evaluated qualitatively (based on appearance, thickness, and imperfections) and quantitatively (based on voltage output and percent viability). Cold spray cells contained unavoidable imperfections and moderate voltages. Hot spray cells contained few imperfections, a perfect viability rate, high ease and speed of construction, but higher variability and lower voltages. Control cells contained technical issues and a low viability rate, but had overall higher voltages.

### **05.03.55 Effects of Sugar Mixtures on Feeding Preferences of Field-Collected Fruit Flies (*Drosophila melanogaster*)**

**Jessica,Huffman** *Southwestern Oklahoma State University*

**Jimena,Aracena** *Southwestern Oklahoma State University*

**Maryanne,Dantzler-Kyer** *Southwestern Oklahoma State University*

Fruit flies, *Drosophila melanogaster*, show preferences between various types of mono- and disaccharides. Our purpose was to test their ability to discriminate between pairs of sugars while freely foraging on a patch of food. Three different sugars (sucrose, glucose, fructose) were tested in combination pairs. A fructose-glucose mixture was used to determine if the flies preferred sucrose to its monosaccharide components. We also tested the effect of an unacceptable sugar (lactose) on the preference for sucrose. The flies were deprived of food for 20 hours and tested undisturbed for one hour in groups of 50 flies in a small arena containing one patch of 24 wells of sugar solution. The solutions were dyed red (12 wells) or blue (12 wells), which later were visible through the abdominal walls and allowed for easy scoring of preferences. The flies preferred sucrose to the fructose-glucose mixture. Lactose increased the preference for sucrose. Flies with purple abdomens (having fed on both sugars tested) were more common when both sugar solutions were acceptable, showing that the flies foraged on more than one resource on a patch and that foraging increased in patches consisting of higher quality resources.

### **05.03.56 Explication of the Bile Salt Resistance Gene Locus in *Escherichia coli***

**Angeline,Satchell** *University of Central Oklahoma*

**James,Bidlack** *University of Central Oklahoma*

**Jennifer,Walling** *University of Central Oklahoma*

Molecular investigations are being pursued to isolate, clone, and sequence *yciM* and *yciS* genes that appear to be responsible for bile salt resistance / sensitivity in *Escherichia coli*. We are using *E. coli* strains BW25113, JW1271, JW1272, JC3272F, and JC3272I to amplify target DNA using polymerase chain reaction (PCR) and then gel electrophoresis to obtain DNA fragments. Our plan is to use the amplified DNA for sequencing and then compare these sequences among strains to identify the exact mutation that leads to bile salt sensitivity. Our team has been successful at amplifying target DNA in some strains of the *E. coli*. The next steps will be to successfully amplify all strains of *E. coli*, sequence the DNA, and make a comparative analysis of wild type and mutant strains of *E. coli*.



### **05.03.57 The Effects of Scaling Abundance on the Pattern of Commonness and Rarity**

**Chris,Butler** *University of Central Oklahoma*

**Nathan,Hillis** *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.

### **05.03.58 Transgenic Crops Shaping the World through Pharmaceuticals**

**Dimitri,Mahee** *Northeastern State University*

Dimitri Mahee Mentor: Dr. Kevin Yueju Wang Molecular and Cellular Biology Laboratory, Department of Natural Sciences Northeastern State University at Broken Arrow, Broken Arrow, Oklahoma, United States, 74014 Abstract: Biotechnology could be a key source to the overall health of the world we live in today. The subject in biotechnology that could advance the human race, specifically, is molecular farming. Molecular farming is a technique that many scientists/researchers utilize to genetically alter organisms, such as plants and the recombinant proteins that lie within, to become widely transformed and produced to give rise to pharmaceutical usage (drug, vaccines, etc). Transgenic crops like tomatoes, in the last decade, have grown to be a huge interest of study. Tomatoes are being under research currently because once they are a transgenic crop vaccines can be created and help one's body to fight against and possibly be cured of: Alzheimer's disease, Hepatitis B, cholera, rotavirus, prostate cancer (the nutrient lycopenes in tomatoes helps with the defense due to the properties it holds) and help produce more insulin for diabetic persons. In addition, it will not be a hindrance to bio-safety concerns on non-targeted biologics like other plants, insects, and pollination. One concern about tomatoes is if mass production can be made in high yields per hectare. Nonetheless, matters are being taken to produce more of this crop and will continue to grow in high number

**05.03.60 Alteration of Flower Morphology Ballota Acetabulosa Influences Pollinator Guild Composition and Behaviour**

**Chelsea,Young** *Muhlenberg College*

**John,Hranitz** *Bloomsburg University*

**John,Barthell** *University of Central Oklahoma*

**Maria Jose,Pastor** *San Francisco State University*

**Montserrat,Plascencia** *University of California Santa Cruz*

**Rhonda,Carson** *University of Central Oklahoma*

**Shiala,Naranjo** *Muhlenberg College*

**Timothy,Salazar** *University of Chicago*

**Victor,Gonzalez** *University of Kansas*

The Greek horehound, *Ballota acetabulosa* (Lamiaceae), is an evergreen shrub native to Southeast Greece, Crete, and West Turkey. Flowers of this plant are bilateral, with filaments and styles located on the adaxial side or top of the flower. Thus, many bee species, have morphological adaptations to passively collect pollen from this type of flowers. Flowers also feature a nectar guide, which may serve to signal reward and guide the searching behavior of pollinators. To investigate how removal of the flower's nectar guide affects bee visitors, we conducted an experiment in two adjacent plots, one control plot and one experimental plot, on the island of Lesbos, Greece. Bee visitation, handling time per bee, and nectar flow per plant were measured during 30-minute trials that were timed at two-hour intervals on each day. Nine bee species visited our plots; however, honey (*Apis mellifera*) and leaf cutter bees (*Megachile lefebvrei*) were the most frequent visitors. Handling time per bee were similar but also displayed high variance, suggesting that individual bees might have learned or that innate differences may exist between species. Our results support the hypothesis that nectar guides reduce searching behavior of bee foragers, but also suggest that different bees may not use nectar guides or that they rely on other clues to locate flowers.

### **05.03.63 ZMapp: The Cure for Ebola?**

**Alfredo, Garcia** *Northeastern State University*

In 1976, the first outbreak of Ebola occurred in Zaire and Sudan and has continued to spread panic to this day. There are five different strains of Ebola, which are all named according to the area where they were first discovered, for example, Ebola-Zaire and Ebola-Sudan. Ebola-Zaire is the most dangerous strain, and is the strain that is plaguing West Africa today. Ebola is usually fatal and the symptoms can range from diarrhea, chest pain, internal and external bleeding. Currently there is no cure or treatment for Ebola, but there is research being done in order to help those who have already contracted the virus. Zmapp is a new therapy that is made up of three different antibodies, which help to prevent the spread of the disease throughout the body. It is produced through molecular farming, which is the use of plants to create cost-effective, and renewable pharmaceuticals. Molecular farming is done by inserting a gene that codes for a specific pharmaceutical into a plant, and this pharmaceutical is eventually harvested, and used for its intended purpose. The antibodies that make up Zmapp are harvested from tobacco plants, and are administered directly into a patient's vein. When the antibodies are injected into a patient, they attach to the Ebola virus, thus preventing it from being able to enter a cell and replicate. The antibodies also help recognize the antigens as foreign, which allows the body to launch an immediate immune response. Testing has been done on anim

### **05.03.64 Uewv (Water- The First Medicine)**

**Norma, Rice** *College of the Mvskoke Nation*

The focus of the research was over local tribal areas of water and the consideration of the importance of clean water. Six local areas were used for sampling in rivers and lake of, the North Canadian River, Okmulgee Creek, Lake Eufaula, Lake Henryetta, and the Arkansas River. Results have indicated a significant amount of bacterial and viral concentrations. Bacterial coli phage presence shows that the concentration of E. coli appears to be elevated. The bacterial isolation techniques used microscopy. For verification of the level hindrance or contamination, plating of growth, coliform screenings, and PFU data were obtained. Analysis for water looked at concentration of oxygen, nitric oxide, ph., and phosphate. This study is still currently ongoing and will continue into the spring water quality screenings as a comparison. Bacterial isolated in water in significant concentrations will be further identified using polymerase chain reaction and DNA sequencing. For now, results still indicate impairment of water quality. Knowing about the importance of clean water sources for local tribal communities only increases the need for educating others about these findings and certain steps that individuals and groups can choose to improve aquatic life.

### **05.03.65 Ultraviolet Fluorescence of the Rattlesnake Rattle**

**Aaron, Place** *Northwestern State University*

**Gabriel, Dunbar** *Northwestern State University*

The western diamondback rattlesnake rattle fluoresces a yellow-green color when exposed to ultraviolet light of 395 nanometers. Previous studies have demonstrated that fluorescence in scorpions is utilized in communication with other scorpions; however, few studies have been conducted on fluorescence in rattles. An experiment was designed to collect fluorescence data in ten species of rattlesnake. Corrected total fluorescence data was gathered on ten species of rattlesnake by exposing preserved specimens to ultraviolet light of 395 nanometers and analyzing the photographs in ImageJ, followed by various statistical analyses. Four hypotheses were tested: Snakes prone to rattling demonstrate more intense fluorescence, snakes from open habitats possess greater fluorescence, snakes with tail banding have greater fluorescence, and snakes with unicolor tails exhibit greater total fluorescence. Results of the analyses provided no support for any of the four hypotheses. Future revisions of the experiment will include more specimens from each species and a more complete representation of the pit viper clade. Additionally, future research will attempt to determine whether the rattle serves as a photoreceptor when hiding under rocks in the same manner that olive sea snakes do, or if the fluorescence in the rattle serves as a lure for prey.

### **05.03.66 Deletion of Antibiotic Resistance Genes from Transgenic Tobacco Using Site-Specific Recombinases CinH and ParA**

**Alexia, Dickey** *Northeastern State University*

Commercially available transgenic plants often contain an antibiotic resistance gene in addition to their novel traits. The antibiotic resistance gene, also known as the selectable marker, is used to screen for transformation events. After this marker is no longer needed, it unnecessarily remains in the plant's genome. Escape of the resistance genes to the environment has raised consumer concern about GMO safety. This research utilizes two novel recombinases, CinH and ParA under control of a seed-specific promoter to remove the unwanted transgenes from genetically modified tobacco while leaving the novel traits intact. This seed-based system can be a powerful tool in plant biotechnology. Both Codon-Optimized and wild type ParA and CinH were cloned into pCambia2300-Phas1470-Nos respectively. Agrobacterium mediated transformation was used to introduce the four binary vectors, pCinH-GUS, pCinH-OP-GUS, pParA-GUS, and pParA-OP-GUS to *Nicotiana tabacum* SR1 leaf discs. The Kanamycin resistant transformants were screened on Kanamycin medium (100mg/L) and later transferred to soil. Reporter gene GUS was used to select for plants expressing novel traits. GUS positive plants have been allowed to set seed. Phas, the seed specific promoter will drive recombinase expression. The recombinase will mediate antibiotic-resistance gene excision, leaving the seeds and subsequent generations marker-free.

### **05.03.67 In vitro tests to evaluate PCL fiber effect on titanium-bone scaffold interfaces Joshua Cody Knight, Fariha Sultana, Mika Barnes, Melville B. Vaughan, Morshed Khandaker**

**Joshua, Knight** *University of Central Oklahoma*

The objective of the study was to determine the influence of the osseointegration on the bonding strength,  $\sigma$ , between titanium (Ti) and bone scaffold due to collagen (CG) and collagen-polycaprolactone (PCL) (CG/PCL) fiber coatings on Ti. A beta-tricalcium phosphate ( $\beta$ -TCP) disc (9.5 mm diameter  $\times$  1.6 mm thickness) was used as bone scaffold. Cells were cultured on the top of Ti, Ti/CG, Ti/CG/PCL and  $\beta$ -TCP surfaces for 14 days.  $\beta$ -TCP were placed on top of Ti/CG and Ti/CG/PCL specimen in a custom made acrylic well to make the coupled  $\beta$ -TCP- Ti/CG and  $\beta$ -TCP-Ti/CG/PCL specimen, respectively. Cell culturing was conducted on the coupled samples for 2 months, followed by tensile measurements on each of the constructs. The coupled samples were glued on the holders in the Evex tensile test stage. Tension tests were conducted at strain rate 0.001 mm/sec to determine the  $\sigma$  values of the samples. No bonding occurred between Ti and  $\beta$ -TCP whereas Ti/  $\beta$ -TCP samples with CG and CG-PCL showed noticeable bonding strength,  $\sigma$ , though the differences of  $\sigma$  between those samples were not significant. This result suggested that both CG and CG-PCL can improve the bonding of Ti/bone.

### **05.03.68 The Advancement of Plant Made Pharmaceuticals**

**Hannah, Meraou** *Northeastern State University*

For centuries, plants have been enhanced through selective breeding. With the emersion of transgenic technology in 1983, more recent biotechnology developments have enabled the establishment of genetically modified (GM) crops. Such advances in technology have allowed for the production of pharmaceuticals in transgenic plants. As plant molecular farming has evolved, biosafety concern regarding possible transgene spread in the environment, and the potential for recombinant molecules to contaminate the food chain has grown. However, strategies such as transformation of the plastid genome, sterility of male plant lines, and use of transgenic plants that can be cultivated in bioreactors minimize these risks.

### **05.03.69 A Novel Method for Non-Invasive Measurement of Stress Hormone Levels in Zebrafish (*Danio rerio*)**

**Alexis, Jones** *Northeastern State University*

**Whitney, DeNeen** *Northeastern State University*

The popularity of zebrafish as a model organism in behavioral neuroscience, neuropharmacology, and specifically in stress research, raises the need for measuring circulating levels of stress hormones. However, due to the small size of zebrafish, blood collection is difficult and involves sacrificing the fish, and the amount of plasma collected is small (1-5 $\mu$ L). Homogenates can also be used to measure hormone levels but this prevents repeated sampling of the same individual. Previously validated non-invasive methods require technical expertise and equipment that may not be available at every institution. Our study investigated use of EIA for non-invasive measurement of cortisol from the holding water of zebrafish. 10 adult wild-type zebrafish were used; individuals were removed from the home tank and placed individually into a well containing 10mL of RO filtered, deionized water for 30 min, 1 hr, or 2 hrs. After this, the water was collected from each well and stored at -20oC until analysis. Water samples were analyzed for cortisol concentration using the ACE™ Competitive EIA and results were interpreted using a microplate reader. We found that measurement of holding water cortisol using this method effectively determines free cortisol released into the water through the gills of zebrafish. Given that cortisol released to holding water correlates positively with plasma concentrations, this method represents a novel alternative to blood collection or whole body homog

### **05.03.70 Some Fleshy Fungi From the Pre-montane Forests of Western Panama**

**Adriana, Corrales Osorio** *University of Illinois at Urbana-Champaign*

**Clark, Ovrebo** *University of Central Oklahoma*

Neotropical montane forests are often dominated by ectomycorrhizal (EM) tree species, yet the diversity of their EM fungal communities remains poorly explored. In lower montane forests in western Panama, the EM tree species *Oreomunnea mexicana* (Juglandaceae) forms locally dense populations in forests otherwise characterized by trees that form arbuscular mycorrhizal (AM) associations. Other common ectomycorrhizal trees in the area are *Quercus* and *Coccoloba* spp. It is important to document and identify the fleshy fungi associated with these trees in order to provide a reference collection for the DNA sequences that are isolated from the root tips. Here we report on some of the fungi collected during the 2014 field season. EM genera commonly found were *Russula*, *Lactarius*, *Cortinarius*, *Boletus*, *Tylopilus*, *Amanita*, *Hydnum* and *Cantharellus*. Many species of these genera resemble temperate species but may be different due to subtle differences in morphology or their DNA sequences. A few examples include *Lactarius indigo*, *Cortinarius violaceus*, *C. bolaris*, *Hydnum repandum* and *Leccinum abellum*. Species with known tropical distributions include *Austroboletus subvirens*, *Velophyrellus pantoleucus* and *Amanita flavoconia* var. *inquinata*. Saprotrophic fungi were also common and examples include *Marasmius cladophyllus*, *Xerula hispida*, *Polyporus tenuiculus*, *Fistulina hepatica*, *Mycena margarita*, *Aseroe rubra* and *Laternea pusilla*.

### **05.03.71 Response of Chlamydomonas reinhardtii to Medium Viscosity**

**Gang,Xu** *University of Central Oklahoma*

**Mai,Do** *University of Central Oklahoma*

**Steven,Karpowicz** *University of Central Oklahoma*

**Thi,Nguyen** *University of Central Oklahoma*

The unicellular alga *Chlamydomonas reinhardtii* contains two cilia, which provide cellular locomotion and environmental sensing. The objective of this study is to determine whether physical forces experienced by the cell affect gene expression, and, conversely, whether gene expression influences cilia behavior. Specifically, we are determining whether different medium viscosities will affect cilia behavior and expressed forces and influence gene expression. Differences in growth medium viscosity do not affect cellular growth rate. However, cells do exhibit a 7-fold decreased velocity in more viscous growth medium. Cells do not appear to retain physical inhibition of motility if transferred from high to low viscosity medium. RNA-seq is being performed on RNA isolated from cells grown in five viscosity conditions. Gene expression results are forthcoming.

### **05.03.72 Molecular Farming of Carrots for Vaccines**

**Joshua,Curtiss** *Northeastern State University*

**Bishr,Swar** *Northeastern State University*

Joshua Curtiss Molecular and Cellular Biology Dr. Kevin Wang 1/26/15 Northeastern State University at Broken Arrow 3100 East New Orleans Street, Broken Arrow, OK 74014 Molecular Farming Carrots for Vaccines Paper review: Molecular farming is not a new topic to the human population. Certain plants and animals have been genetically modified specifically for medicinal use. Using recombinant technology, we can fundamentally change the DNA of an organism and cause them to produce compounds that have medicinal purposes. Molecular farming has evolved the technique of using these plants or animals to produce specific proteins that are usable by humans as vaccines or treatments of various diseases. One example is the use of carrot tap root in producing a multitude of vaccines, such as: Hepatitis B, Measles, Human Immunodeficiency virus, Chlamydia trachomatis, Mycobacterium tuberculosis, and Yersinia pestis (also known as the Black Death). Research into all of these diseases is ongoing, but the carrot is important because it is the first plant approved to produce biopharmaceuticals for human use.

#### **05.03.74 OHP protein may preserve red algal photosynthesis from high light damage**

**Steven, Karpowicz** *University of Central Oklahoma*

**Sukyong, Kwak** *University of Central Oklahoma*

One helix protein (OHP) is associated with the photosynthetic apparatus in green plants and is necessary for recovery of photosynthetic activity after exposure of the plant to increased light intensities. Red algae are distant relatives to green plants and algae. We have identified several genes in the red alga *Porphyra umbilicalis* (nori) that encode proteins that are homologous to photoprotective proteins in green plants. We are specifically investigating whether the function and regulation of the *Porphyra* OHP homolog is similar to that of green plants' OHP. An artificial microRNA to knock down expression of the *Chlamydomonas reinhardtii* OHP gene has been created. Knockdown mutants that demonstrate a high-light sensitive phenotype are being tested for genetic complementation with the *P. umbilicalis* OHP gene. Green plants' OHP mRNA and protein expression are known to respond to high light intensity. The response of *P. umbilicalis*' OHP mRNA to high light levels is being tested with a time course experiment in which *P. umbilicalis* blades are exposed to elevated light intensities. Gene expression data are being collected.

#### **05.03.75 "LONG-TERM OUTCOMES OF SERVICE-LEARNING ON CIVIC ENGAGEMENT AND PROFESSIONAL NURSING PRACTICE"**

**Barbara, Arnold** *University of Central Oklahoma*

Although there is a growing body of knowledge concerning service-learning in professional nursing education, nursing research reports minimal studies that sufficiently address the effects of service-learning strategies on baccalaureate nursing alumni in promoting self-efficacy toward long-term civic engagement or development of professional practice. The purpose of this predictive, correlational study was to determine if a relationship existed between participation in the service-learning experience and self-efficacy toward civic engagement as a long-term outcome of professional nursing education and the development of professional practice in nursing alumni. Spearman's Rho was used to correlate the independent variable of service-learning with the dependent variables of civic engagement and professional practice. Multiple regression analysis indicated that service-learning had less than a 4% effect on civic engagement attitudes and a 6% effect on community service hours (behavior). The Social Cognitive Theory, specifically self-efficacy coupled with the construct of practical reasoning provided framework for the study. Results concluded that service-learning had a low to moderate relationship with both long-term civic engagement and the development of professional nursing practice. Key Terms: civic engagement, service-learning, self-efficacy

### **05.03.76 Influence of climate on radial growth of blackjack oak (*Quercus marilandica*, Munchh.) in the central Cross Timbers, Oklahoma.**

**Chad,King** *University of Central Oklahoma*

Plant species at the edge of their contemporary habitat distributions are more affected by changes in climate. As such, climate change has the potential of altering plant species distributions. Blackjack oak (*Quercus marilandica*, Munchh.) is at its western distribution limit in central Oklahoma and is historically a dominant tree species of Cross Timbers forests. However, very little is known about what factors (temperature, precipitation, PDSI) have the greatest effect on its growth. This study's objective was to assess the correlation of climate variables on radial growth in *Q. marilandica*. Increment cores (n=49) were collected from *Q. marilandica* in three forest stands in central Oklahoma and were used to run climate analysis to determine effects on radial growth. Data analysis suggest significant positive correlation between annual radial growth and monthly precipitation (October, January, May) and significant negative correlation between annual radial growth and temperature (June, July). Analysis also suggest available moisture (average monthly PDSI) has a significant effect on radial growth ( $r > 0.40$ ,  $p < 0.05$ ). These results suggest that declines in precipitation due to climate change in central Oklahoma could affect *Q. marilandica* populations at their current distribution limits. With a shift to an even greater arid climate in the region, *Q. marilandica* could face potential declines in forest stands causing a shift of species composition in south-central forests.

### **05.03.77 Epigallocatechin Gallate Inhibits Dupuytren's Myofibroblast Phenotype in a Two-Dimensional Culture**

**Joana,Pantoja** *University of Central Oklahoma*

**Melville,Vaughan** *University of Central Oklahoma*

**Sonnie,Gainer** *University of Central Oklahoma*

Dupuytren's contracture is a hand condition that pulls one's fingers to a bent position due to the excessive tissue that forms under the skin. This is treated through surgery but recurrence is very likely, so most of the time patients have to go through surgery several times. Myofibroblasts have an effect on wound healing and excessive scarring in patients with Dupuytren's contracture and other diseases. Antioxidants are thought to interfere with myofibroblast differentiation. EGCG (green tea extract) is an anti-inflammatory and anti-oxidant we predicted may inhibit myofibroblast growth. In this experiment, a coverslip staining technique was used to test this prediction. The results showed that adding EGCG to cells does inhibit the percentage of myofibroblasts in a population of fibroblasts derived from Dupuytren's contracture. Our concurrent studies are testing whether the contractile function of cells is also inhibited by this treatment. These results may help us understand the cell biology of Dupuytren's contracture and lead to new treatments.



### **05.03.78 Combined Effects of Fluoxetine and $\beta$ -Funaltrexamine on Chemokine Expression in Normal Human Astrocytes**

**Zinar, Simsek** *Oklahoma State University*

Introduction: Neuroinflammation is a key component of brain disorders including neurodegenerative disorders, infection and depression. The therapeutic effectiveness of some antidepressants such as fluoxetine (FLX) is reportedly due in part, to anti-inflammatory action. We are particularly interested in the effects of FLX and other novel anti-inflammatory agents. Astrocytes have a fundamental role in neuropathogenesis in part, through the release of neuroinflammatory chemokines (e.g. CXCL10). Our goal was to explore the combined effects of FLX and  $\beta$ -funaltrexamine ( $\beta$ -FNA), a novel anti-inflammatory agent, on CXCL10 expression in normal human astrocytes (NHA). Methods: NHA were maintained in cell culture with media replenished every 48 to 72h. Chemokine expression was induced with IL-1 $\beta$  (3ng/ml) or IFN $\gamma$  (10ng/ml) + HIV-Tat 1-72 (100 nM).  $\beta$ -FNA and FLX (5 $\mu$ M or 10 $\mu$ M) were added at time of stimulation. CXCL10 levels in media were determined by enzyme-linked immunosorbent assay (ELISA). Western blotting was used to assess NF- $\kappa$ B activation. MTT viability assay was performed to assess cytotoxicity of treatments. Results: Unstimulated cells expressed negligible CXCL10; however, IL-1 $\beta$  and IFN $\gamma$  + HIV-Tat 1-72 significantly induced CXCL10. As we previously reported 10 $\mu$ M  $\beta$ -FNA inhibited CXCL10 expression whereas neither 5 $\mu$ M  $\beta$ -FNA nor FLX (5 $\mu$ M or 10 $\mu$ M) were inhibitory. Interestingly, the combination of 5 $\mu$ M

### **05.03.81 Autophagy plays an essential role in neuronal development and maintenance.**

**Andrea, Holgado** *Southwestern Oklahoma State University*

**Ashley, Powers** *Southwestern Oklahoma State University*

**Matt, Abbott** *Southwestern Oklahoma State University*

For the past decades, scientists noted that many neurodegenerative disorders, such as Alzheimer's, Huntington and Parkinson's Disease are characterized by pathological accumulations of protein aggregates. However, more recently, analyses from brain autopsies and animals models show that the accumulation of toxic protein aggregates come together with a reduced protein recycling machinery. Autophagy, the primary focus of the research summarized herein, involves the removal of cell debris and the recycling of protein aggregates in health and disease. BEC-1, a *Caenorhabditis elegans* protein conserved from human to yeast, was shown to play an essential in autophagy and recycling of nutrients under starving conditions. Furthermore, recent research suggested that BEC-1 may link recycling of nutrients in nerve cells with growth, differentiation and maintenance of neurons. To test this probable link, we characterized the neuronal structure and function of *C. elegans* mutants expressing all proteins except BEC-1. Collectively, we found that BEC-1 mutants have developmental and functional defects at the level of motor neurons. Imaging analysis revealed a reduction in the number of motor neuron extensions called commissures. Quantification of motor function demonstrated severely dysfunctional locomotion. Last, results of chemical dose-response assays indicate neuronal synapses have a normal neurotransmission.

**05.03.82 Lanthionine ketimine is a neurotrophic agent that promotes axonal elongation and autophagy.**

**Andrea, Holgado** *Southwestern Oklahoma State University*

**Ashley, Rodriguez** *Southwestern Oklahoma State University*

**Elizabeth, Jansing** *Southwestern Oklahoma State University*

**Lyly, Van** *Southwestern Oklahoma State University*

Collapsin response mediator proteins (CRMPs), are cytoskeletal adaptor molecules involved in a variety of normal cellular functions including alteration of cell shape and cell communication. CRMP2s have also been associated with pathological disorders and neurological diseases. For instance, CRMP2 protein collects in cytoskeletal tangles in Alzheimer's disease, which may contribute to neural degeneration in this disorder. In other examples, differences in CRMP2 expression have been documented in some subsets of patients suffering paranoid schizophrenia. Lastly, the anticonvulsive drug lacosamide (Vimpat) was found to act by binding to CRMP2, which unmasked the pharmacological importance of CRMP2-binding in epilepsy. Thus, based on these observations, we hypothesize that CRMP2 plays a central role in neuronal connectivity and may represent a critical junction linking neural brain function with neural pathologies. Moreover, we reasoned that if we target CRMP2 therapeutically, we may reverse or slow-down onsets of many neurodegenerative disorders. To this end, we began a study focused on the in vivo effects of lanthionine ketimine (LK), a natural brain metabolite and neurotrophic agent, in *C. elegans*. Work from our group shows that LK partially rescues CRMP2 hypomorph mutants while activating a recycling mechanism called autophagy. These data provide evidence for in vivo function of LK and reveal new opportunities for therapy development when CRMP2 functionality is compro

### **05.03.83 Determining the toxic effects of silver nanoparticles using *C. elegans*.**

**Abby,McKisson** *Southwestern Oklahoma State University*

**Andrea,Holgado** *Southwestern Oklahoma State University*

**Carey,Pope** *Oklahoma State University*

**Jake,Gregston** *Southwestern Oklahoma State University*

**Kalkan,Kaan** *Oklahoma State University*

**Tony,Sanchez** *Southwestern Oklahoma State University*

Silver nanoparticles are frequently used as an antimicrobial agent in paints, toys, household chemicals and appliances. Even though these particles are the most widely used nanomaterial, controversy surrounds the analysis of their toxicity. To shed some light in this field, we used the model organism *C. elegans* and study the effects of silver nanoparticles by determining mortality rates. In contrast to some published work, our finding showed that nematodes exposed for 24 h and 48 h to increasing concentrations of silver nanoparticles washed extensively to remove unbound silver did not show increasing mortality when compared to those exposed to citrate (vehicle solution). Moreover, examinations of mortality rates of animals exposed to silver nitrate or to unwashed silver nanoparticles (contaminated with dissolved silver nitrate) suggested that silver ions were the ultimate toxicant. One hundred percent of nematodes died after 48 h exposure to plates impregnated with 4 ml of silver nitrate solution or 4 ml of non-washed silver nanoparticles, while little lethality was noted with similar exposures to either citrate or washed nanoparticles. Together, our observations show that *C. elegans* can be used as an inexpensive in vivo model to test the toxicity of emerging materials. More specifically, these studies of silver nanoparticle point out the importance of avoiding free silver contamination when used in products such as paint, toys, and antimicrobials.

### **05.03.84 Establishing a Minimum Bactericidal Concentration for Aqueous Extractions From Raw Fresh Garlic**

**Heather,Jackson** *Rogers State University*

Water borne illnesses continue to be a major problem for more than one third of the human population. In areas of the world where access to safe water is questionable, access to modern medicine is also problematic. Garlic has been used medicinally for millennia with increasing study into the active compounds. Previous studies have suggested sulfur-based allicin, a protease which forms when raw garlic is crushed or cut, is the chemical of interest. Two bulbs (125.23g) of organic garlic were chopped and washed with sterile water, yielding 9 mL of liquid. This garlic stock was serially diluted with Mueller-Hinton Broth and inoculated with *Escherichia coli*. Minimum bactericidal concentration (MBC) of garlic was 83.9 mg/mL. Although the consumption of raw garlic in solid form may deliver this dosage within the 4g maximum daily tolerance for humans, it took more than 4g of garlic to reach the MBC with water extraction. The possibility of hypersensitivity reactions in the skin due to garlic exposure during handling makes this model inadvisable as an acceptable substitute for modern medications.

### **05.03.85 Comparative analysis of Dictyostelium discoideum and Myxococcus xanthus**

**Canisia, Tatah** *Southwestern Oklahoma State University*

**Muatasem, Ubeidat** *Southwestern Oklahoma State University*

Dictyostelium discoideum is a powerful 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. Myxococcus xanthus is a gram-negative bacterium with a developmental life cycle, social behavior and multicellular morphogenesis that resemble the eukaryotic Dictyostelium discoideum. This resemblance between a prokaryotic and a eukaryotic organism can hold key information about the common evolutionary ancestor of these social organisms and probably their relation to other organisms with similar characteristics. In this study both organisms are being compared in growth and simple physiology to initiate a larger project.

### **05.03.86 In Vivo Interactions of Mcm10 and S Phase Checkpoint Proteins Analyzed Using FRET**

**Joseph, Cameron** *Northeastern State University*

**Shaina, Riggs** *Northeastern State University*

Cell cycle checkpoint proteins delay DNA replication to allow for repair of damaged DNA or allow for apoptotic processes. Cancerous cells bypass these checkpoint mechanisms. A greater understanding of these checkpoint mechanisms could provide possible targets in anti-cancer therapies. Minichromosome maintenance protein 10 (Mcm10) has been previously found to be involved in DNA damage signaling with the 9-1-1 clamp during the G1 phase of the cell cycle. Using yeast two hybrid techniques, our lab has found that Mcm10 interacts with Mrc1 and the C-terminus of Pol2 which is the catalytic subunit of Polymerase epsilon (Pol  $\epsilon$ ). Mrc1, Pol  $\epsilon$ , and DNA polymerase B 11 (Dpb11) are essential for cell viability and work in a complex to signal for S phase checkpoint. The goal of our project is to observe if Mcm10 is part of this signaling complex. To pursue this goal, we will be using FRET to study these interactions. We will create double-tagged strains of Mcm10-YFP with Mrc1-CFP/ Pol2-CFP/ Dpb11-CFP/ Dpb2- CFP by homologous recombination. These strains will be sequenced to confirm the correct integration of the fluorescent tags on the genome. We wish to extend these studies to cells exposed to DNA damaging conditions. We hypothesize that Mcm10 will closely interact with Pol2, Mrc1, and Dpb11 during S phase and DNA damage, and serve as a component of the checkpoint control pathway

### **05.03.87 Do pre-cancerous keratinocytes up-regulate alpha smooth muscle actin in response to TGF-beta?**

**Jessica,Webb** *University of Central Oklahoma*

**Melville,Vaughan** *University of Central Oklahoma*

**Zayn,Taleghani** *University of Central Oklahoma*

There is evidence that myofibroblast presence in tumor stroma leads to poor prognosis. Mechanical tension enhances differentiation of myofibroblasts. Myofibroblasts are distinguished from fibroblasts by the assembly of  $\alpha$ -sm actin filaments. Transforming growth factor-beta (TGF- $\beta$ ) is the best-known inducer of  $\alpha$ -sm actin and is correlated with increased contractility. Precancerous keratinocytes lead to two types of carcinomas. In vitro carcinomas can form through a pathway which involves the up-regulation of the H-ras protein. Ker-CT-Ras demonstrate an epithelial to mesenchymal transition (EMT), meaning the cells begin to demonstrate fibroblast form and function. Fibroblasts generate tension in the dermis during wound healing. So far, Ker-CT-Ras has shown an ability to generate tension in a dermal equivalent with an increased effect in the presence of TGF- $\beta$  as well as a reduction of this ability when dosed with N-acetyl cysteine (NAC). Grinnell's stress-relaxation collagen matrix model provided the necessary microenvironment for myofibroblast formation. The model was originally used to investigate properties of fibroblasts, but we have appropriately extended its use to Ker-CT-Ras. Previously, we gathered comparative data on the Ker-CT-Ras matrices to the tension-generating ability of fibroblast matrices (DP-147-H-Tert). Now, we will present preliminary Western blot data examining the production of  $\alpha$ -sm actin in Ker-CT-Ras collagen matrices.

### **05.03.88 Understanding Mcm10: Polymerase epsilon interaction in budding yeast**

**Brandy,Fultz** *Northeastern State University*

**Dawn,Bender** *Northeastern State University*

**Holly,McIntyre** *Northeastern State University*

**Lyndsey,Weeks** *Northeastern State University*

**Sapna,Das-bradoo** *Northeastern State University*

Errors that occur during DNA replication can cause mutations leading to genomic instability. These elevated rates of mutation are often distinguishing characteristics commonly associated with the formation of cancer. During replication, a series of critical checkpoints evaluate the integrity of the DNA as well as the replication machinery. It is known that the checkpoints stabilize the fork and help to assemble the repair machinery. However, how the checkpoint pathway is activated is not completely understood. Preliminary studies suggest that Minichromosome maintenance protein 10 (Mcm10) interacts with the catalytic domain of Polymerase epsilon (Pol2) to activate the stress response pathway in *Saccharomyces cerevisiae*. Interestingly, Mcm10 interacts with the C-terminus checkpoint domain of pol2. Our goal here is to map the exact region on the C-terminus of Pol2 that binds to Mcm10. We will also perform experiments to determine if this binding site is distinct from Dpb2, Dpb3, and Dpb4 binding to Pol2. Lastly, we would like to determine if Mcm10 binds to Dpb11, a protein important for both replication initiation and checkpoint activation.

### **05.03.89 Floral and Faunal Survey in a Post-Oak – Blackjack Oak Forest and Tallgrass Prairie-Savanna Ecosystem**

**Mark, Swanson** *Tulsa Community College*

**Ryan, Williams** *Tulsa Community College*

Tulsa Community College – Southeast Campus, preserves 5-6 hectares of land, consisting of post-oak – blackjack oak forest, fragmented tallgrass prairie-savanna, and bottomland vegetation types. In order to assist conservation efforts, this study provides the first documentation of floral and faunal species present in the area. Additionally, we studied associations between faunal species and vegetation types, predicting that specific fauna would be found more often in either forest or prairie-savanna due to resources and habitat structure. Baited camera traps and fortuitous encounters were utilized to detect fauna. Faunal species richness was comparable in the forest and prairie-savanna habitats, and 36 species, including 10 mammal, 17 bird, 2 amphibian, and 7 reptile species, were identified in the area as a whole. Also, 93 vascular plant species were identified via non-random sampling, with 79 genera, and 33 families represented; 48 forbs, 15 graminoids, and 30 woody species were represented. Animal activity, based on the number of captures, and moon phases were compared, and showed that overall animal activity fluctuated with different phases. Activity decreased most during full moon and waning crescent phases. The combined results may be used to support and encourage conservation efforts for the preserve.

### **05.03.90 Mcm10 and Polymerase Epsilon: Communication in Maintaining Genome Stability**

**Andrew, Rutter** *Northeastern State University*

**Brandy, Fultz** *Northeastern State University*

**Daniel, Tinervia** *Northeastern State University*

**Justin, Parrish** *Northeastern State University*

**Sapna, Das-bradoo** *Northeastern State University*

Minichromosome maintenance 10 (Mcm10) and DNA polymerase epsilon (Pol $\epsilon$ ) are essential replication proteins. Mutations in each one has been shown to cause genome instability, a hallmark of cancer cells. Mcm10 is required to facilitate both replication initiation and elongation. Pol $\epsilon$  is present during initiation in the preloading complex and is critical for replicating the leading strand DNA during elongation. It is a unique polymerase due to its role also in the DNA damage checkpoint pathway. Pol $\epsilon$  is made up of four subunits: Dbp2, Dpb3, Dpb4, and Pol2. Pol2 is the catalytic subunit of Pol $\epsilon$ . Results from our lab show a strong interaction between Mcm10 and Pol2, the catalytic subunit of Pol $\epsilon$ . Our project attempts to determine the significance of this interaction which may be involved in checkpoint activation. We plan to synchronize yeast cells in different phases of the cell cycle and study the Mcm10:Pol $\epsilon$  interaction by co-immunoprecipitation during normal replication. 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 treatment.

### **05.03.91 Oriental Medicine: The Five Elements**

**Ashley, Hopkins** *Northeastern State University*

The Five Elements of Oriental Medicine are known as wood, fire, earth, metal and water. The elements are a major focus in oriental medicine. It is a theory, when all the elements are in balance, the being is in harmony. The elements work to balance one another out. If one element is out of balance, the corresponding element is also out of balance. The elements each represent different sources. The Wood Element represents the liver and gallbladder and its corresponding element, wood, represents the Spleen and Stomach. Fire represents the heart, small intestines and pericardium and its corresponding element, metal, represents the large intestines and lungs. The last element, water, represents the bladder and kidneys. When one of the elements are out of sync, there are some "illnesses" that one may experience, depending on the element that is not in balance.

### **05.03.92 The Expression and Purification of The Recombinant Magnetosome Associated Protein Mad2 From Desulfovibrio magneticus Strain RS-1 in Escherichia coli**

**Bradly, Burke** *Southwestern Oklahoma State University*

**Denis, Trubitsyn** *Southwestern Oklahoma State University*

**Emily, Kessler** *Southwestern Oklahoma State University*

**Sergey, Golenchenko** *Belorussian State University*

A diverse group of prokaryotic organisms known as magnetotactic bacteria produce magnetosomes, crystals of magnetite or greigite surrounded by a lipid membrane. Magnetosomes are organized in chains which allow cells to be oriented by the Earth's magnetic field. Usually, magnetite crystals have either cuboctahedral or elongated (bullet-shaped) morphology. The molecular mechanism responsible for the crystal morphology remains unknown. This work is aimed at investigating of the role of the Mad2, a protein found to be involved in magnetosome formation in *Desulfovibrio magneticus* strain RS-1. Two expression vectors with 6xHis tags on either C-terminal or N-terminal ends of mad2 gene were synthesized with codon optimization for expression in *Escherichia coli* BL21. We are working on the transformation of synthesized vectors in host bacterium. Following that, the overexpression, based on the use of a T7 promoter will be performed; results will then be visualized on a gel electrophoresis. Once the optimization of expression is carried out, the Mad2 tagged with histidine residues will be purified using immobilized metal affinity chromatography. This work will be advanced by experiments on iron binding assay using radioactive isotope Fe55 and investigating of the effects on crystal morphology during biomineralization in vitro.

### **05.03.93 Effects of Altered Protein Phosphatase 5 (PP5) in Cancerous and Non-Cancerous Cells**

**Kathryn,Cuevas** *Southeastern Oklahoma State University*

**Teresa,Golden** *Southeastern Oklahoma State University*

Serine/threonine Phosphatase 5 (PP5) is an enzyme that has a role in the processing of signals received by cells. It has been shown that overexpression of PP5 increases the growth of breast cancer cells (MCF-7), increasing cancer cell survival. Overexpression of PP5 in neuronal cells has been observed to reduce the severity of Alzheimer's disease yet result in cell death in healthy human cells. To further understand these differences, we compared various catalytic PP5 mutants to fully functional PP5 expression in HF-12 human fibroblast cells and MCF-7 breast cancer cells using lipofectamine-based transfection inclusive of the PLUS reagent (Life Technologies) to initiate expression from normal or mutated PP5-EGFP constructs. We also used SYTOX Orange and Calcein Blue dyes on transfected breast cancer cells to observe correlations between mutated and non-mutated PP5-EGFP constructs. At various intervals, cells were observed using fluorescent microscopy under transmittance 4x/10x and 20x/40x, and fluorescent protein channels GFP, RFP and DAPI to detect fluorescence from transfected and dyed cells. HF cells transfected with PP5-EGFP and mutations varied in response. Control HF cells without extra PP5 exhibited health while fluorescing HF cells with PP5 and mutants were observed most commonly as dying cells, correlating with previous lab data. Overexpression of PP5 in healthy normal cells results in cell death. Studies with MCF-7 and comparisons to HF-12 are in progress.

### **05.03.94 Molecular Farming – Potato Ashley Strain Mentor: Dr. Kevin Yueju Wang Molecular & Cellular Biology Laboratory, Department of Natural Sciences Northeastern State University at Broken Arrow**

**Ashley,Strain** *Northeastern State University*

Molecular farming is used to mass produce plants with the ability through the use of transgenic plants to replace certain pharmaceuticals such as antibodies, hormones, vaccines, and even growth factors. Transgenic potato plants were the first plants in 1990 used to create plant-derived pharmaceutical proteins. Human serum albumin was the first recombinant plant-derived pharmaceutical protein. After years of research the potato has led to many products approaching commercialization. Arntzen group is working with transgenic potato plants to produce many plant-derived pharmaceuticals such as a vaccine against Diarrhoea, Hepatitis B, and the Norwalk virus infection. Transgenic potato plants can also be used in the production of veterinary vaccines. Transgenic potato plants are an inexpensive option for replacement of many pharmaceuticals. According to current research being done on new drugs and vaccines, 250 acres of transgenic potato plants can produce enough plants to produce enough Hepatitis B vaccine to meet South East Asia's annual demand. The world has a growing need for pharmaceuticals. With a growing need the cost of these pharmaceuticals can be overwhelming for patients which may lead to very few of the pharmaceutical needs actually met. Transgenic potato plants through research have shown to be a viable, cost-effective option for the growing need of pharmaceuticals nationwide.



### **05.03.96 Thermal Parameters of Microhabitats of Lizards in the Wichita Mountains**

**Jetta, Trammell** *Cameron University*

**Matthew, Van Sant** *Cameron University*

**Saranah, Isenberg** *Cameron University*

Previous work has shown that *Sceloporus consobrinus* (the prairie lizard) and *Crotaphytus collaris* (the Eastern collared lizard) prefer different microhabitats within the Wichita Mountains. Prairie lizards might be choosing microhabitats to avoid competition with or predation by collared lizards. Alternatively, prairie lizards may be accommodating different thermal preferences as they have lower preferred body temperatures than collared lizards. The body temperature of lizards is influenced by factors that include wind speed, conduction, solar radiation, air temperature, and organismal anatomy. Operative temperature is a thermal parameter that accounts for all of these factors. We tested the hypothesis that lizards are choosing microhabitats based on available environmental temperatures rather than to avoid competition or predation. We used fourteen anatomically correct copper lizard models ranging in snout-vent length from 2.7-7.5cm as operative temperature thermometers. We placed models in various locations suitable for prairie lizards within five sites in the Wichita Mountains Wildlife Refuge during summers of 2013 and 2014. Additionally, we recorded air temperature, wind speed, and relative humidity throughout the day. We then overlaid this data with the preferred body temperatures of each lizard species to determine if lizards were choosing areas that best matched their thermal preferences.

### **05.03.97 Antagonistic interactions between *Pseudomonas aeruginosa* isolated from different age groups of cystic fibrosis patients**

**Anna, Wright** *Oklahoma State University*

*Pseudomonas aeruginosa* is an opportunistic human pathogen affecting cystic fibrosis (CF) patients and immunocompromised individuals contributing significantly to morbidity and mortality. Once infected with *P. aeruginosa*, patients are chronically colonized and unable to clear the infection even with antimicrobial treatment. *P. aeruginosa* is inherently resistant to many antimicrobials which has encouraged the hunt for novel potential therapeutics. Recently, *P. aeruginosa* isolates obtained from the same CF patient were shown to interact antagonistically where secreted signals from one isolate decreased protease production by another isolate. This antagonistic interaction also decreased the virulence of the virulent *P. aeruginosa* isolate. The purpose of this study was to determine if *P. aeruginosa* isolates from a variety of patients in three different age groups (under 13, between 13 and 18, and above 18) would respond to the antagonistic signals. Two antagonistic signal producing *P. aeruginosa* isolates (14672 and 14651) were co-cultured with *P. aeruginosa* isolates obtained from various patients. After *P. aeruginosa* cultures are grown and mixed they are spotted onto skim milk plates to test for the levels of protease production. Protease production is measured by a zone of clearing around the bacterial culture. The mixed cultures are then compared to individual strains also spotted on the skim milk plates. This method was used to test *P. aeruginosa* isolates from all age

### **05.03.98 Microbial Pathogenesis of Pseudomonas aeruginosa in Microgravity**

**Alina,Shretha** *Southwestern Oklahoma State University*

**Eric,Paul** *Southwestern Oklahoma State University*

**Jesse,Jahn** *Southwestern Oklahoma State University*

Stressors during space take their toll on the human body, particularly the immune system, increasing the susceptibility of astronauts to opportunistic pathogens like Pseudomonas aeruginosa. Pseudomonas aeruginosa, a bacterium found in soil, water and on the skin, it can cause urinary tract, lung, and kidney infections. This microbe was grown in conditions mimicking micro-gravity and normal gravity conditions. Twitching assays were conducted to examine if micro-gravity conditions enhance pathogenesis and disease establishment. After growth periods, P. aeruginosa grown under zero gravity conditions showed a significant difference in the spreading/ twitching growth on 0.3% agar motility plates, as well as a difference in colony morphology, compared to cultures grown under normal gravity conditions. We also observed that two strains of Pseudomonas aeruginosa (PA01 and PA14) caused greater necrotic zones in bio-assays using lettuce leaves when grown under micro-gravity conditions. These results led us to believe that Pseudomonas aeruginosa (both PA01 and PA14) shows increased virulence under micro-gravity conditions. We have identified three potential proteins involved in increased twitching/motility and two of three proteins were over expressed in the micro-gravity grown microbe compared to the microbe grown under normal conditions. The third protein was under expressed in the micro-gravity grown microbe. We plan to further examine the function of the three proteins.

### **05.03.99 The study of Azoreductase enzymes in Bacillus cereus**

**K.J.,Abraham** *Langston University*

**TaJae',Lloyd** *Langston University*

The study of Azoreductase enzymes in Bacillus cereus TaJae' Lloyd and K.J. Abraham, Department of Biology Langston University, Langston, Oklahoma 73050 Azoreductase enzymes in human intestinal bacteria biotransform azo dyes into carcinogenic compounds. Azo dyes are synthetic dyes that contain an azo group. Azo dyes are widely used in the pharmaceutical, textile, food, and cosmetic industries. Azoreductase enzymes catalyze the reductive cleavage of azo linkages to produce aromatic amines, many of which are carcinogens. The hypothesis is that the bacterium, Bacillus cereus will metabolize the azo dye because of the presence of the azoreductase enzyme. The objective of this study is to investigate the presence and activity of azoreductase enzymes. Bioassay experiments with B. cereus and an azo dye, Acid Red 27 show presence of azoreductase activity. Future studies will include cloning and sequencing of the azoreductase gene.

### **05.03.100 Dietary Sugar and Protein Increases Cancer in a Drosophila Model**

**Harsh,Patel** *Northeastern State University*

**Jacob,Yerton** *Northeastern State University*

**Joseph,Ahlander** *Northeastern State University*

Dietary restriction may be a viable strategy to reduce cancer incidence. The study of caloric restriction in a Drosophila model of cancer, called eye-ful, has shown to be a cancer reducing factor in tumorigenic fruit flies. However, it is not clear whether this effect is due to lack of a specific macronutrient rather than wholesale caloric restriction. In this experiment, we studied the effects of dietary restriction of specific macronutrients on tumor formation in a Drosophila model of cancer. Our experiments revealed that protein and sugar supplemented flies exhibited about a fourfold increase in eye tumors, whereas flies supplemented with fats and starch showed very little change relative to the low calorie control. Overall, these results suggest that general dietary restriction of proteins and carbohydrates may be an effective anti-cancer strategy with a specific emphasis placed on reducing dietary sugars rather than complex carbohydrates.

### **05.03.101 Pollinator Traits Correlate with Nectar Standing Crop Levels in an Invasive Plant Species found in Island Ecosystems in Greece and the USA**

**Harrington,Wells** *University of Tulsa*

**JeAnna,Redd** *University of Central Oklahoma*

**John,Barthell** *University of Central Oklahoma*

**John,Hranitz** *Bloomsburg University*

**Theodora,Petanidou** *University of the Aegean*

**Victor,Gonzalez** *University of Kansas*

Animal species interact in a variety of ways (negative, positive and neutral) in order to acquire resources they need to survive in their respective environments. Competition is a negative interaction that can be mediated in ways that reduce stress among competitors. To understand this phenomenon, we recorded numbers, sizes and types of bees found at plots of the highly invasive weed species yellow star-thistle, *Centaurea solstitialis*, in both the USA (on Santa Cruz Island) and Greece (on the island of Lesbos). Larger bodied bees were, on average, most common at high nectar volume plots of this plant species while smaller bodied species were common at low nectar volume plots. This pattern was consistent between locales and over time. These results are also consistent with the hypothesis that pollinator species minimize direct competition by partitioning their foraging efforts in a manner that avoids physical contact with other species at flowers. The underlying mechanism for this process is under investigation.

**05.03.102 The Effects of FlexHets on the Activity of STAT3**

*Dana,Rundle University of Central Oklahoma*

*Felix,Ramirez University of Central Oklahoma*

The Effects of FlexHets on the Activity of STAT3

**05.03.104 Litterfall Accumulation and Composition: from the Ecotone into Primary Forest at Las Cruces, Costa Rica**

*Morgan,James Langston University*

Edge effects can alter forested ecosystems due to changes in light, wind, and soil moisture that occur when forests become fragmented. Litterfall dynamics are affected by edge effects due to phenological responses of plants and animals to the altered abiotic factors. We predict that there will be a difference in litterfall biomass from the edge to the interior of a primary forest. In this study we placed 10 50x50 cm baskets on a 100 meter transect at the ecotone of a secondary and primary forest. We placed litterfall baskets at 0 meters, 30 meters, and 100 meters into primary forest. Litterfall was collected once a week over a 3 week sampling period, sorted into 5 categories to get individual biomass of leaves, reproductive parts, woody, mosses, and miscellaneous. There was no difference in litterfall biomass from the ecotone into the primary forest. However, litterfall complexity was greater 100m into primary forest compared to either 0 or 30m into primary forest. Greater litterfall complexity could provide more niches to support greater arthropod diversity and this may affect decomposition and nutrient cycling.

**05.03.105 Sexual conflict in an ecological context**

*Rickey,Cothran Southwestern Oklahoma State University*

Sexual conflict is a form of male-female interaction that is beneficial for one sex and detrimental to the other. Such conflicts have been increasingly studied as important engines of evolutionary change. Theory suggests that the sexes may engage in arms races over the control of mating interactions resulting in rapid changes in sexually antagonistic traits (i.e. traits that determine the outcome of these interactions). This field of behavioral ecology has been scrutinized because empirical studies testing the assumptions of sexual conflict theory often lack ecological realism. We are currently exploring how the ecological context affects the costs and benefits of mating interactions in small crustaceans (freshwater amphipods in the genus *Hyaella*) that are found in a variety of freshwater habitats. We will share discoveries about how changes in the ecological context affect the costs of mating and the ability of males and females to “build” traits used to resolve conflicts over mating. Our work demonstrates that understanding sexual conflict over mating as an engine of diversification requires knowledge of the ecological context in which mating takes place.

**05.03.106 Denning and Nesting Sites of Neotoma cinerea by Radio Telemetry**  
**Mary, Jordan Langston University**

The bushy-tailed woodrat (*Neotoma cinerea*) is a medium-sized rodent found throughout the Pacific Northwest, North Dakota, northern New Mexico and the Sierra Nevada (Carey 1991). Bushy-tailed woodrats are very important animals in the forest food-chain. They are one of the most important species in the diet of the Northern Spotted Owl (*Strix occidentalis caurina*) (Wilson 2013). The Northern Spotted Owl is one of the most studied bird species (Zabel 2003) and in 1990, mainly due to habitat loss, was listed as a federally threatened species (Olson 2004). Although bushy-tailed woodrats serve important ecological roles, there is relatively little information about their life history traits or habitat needs. Recently, studies have begun to increase. Several bushy-tailed woodrats were caught in traps and radio-collared for tracking. Being an aboreal species, it can be assumed that most of the bushy-tailed woodrats' den locations will be in trees, particularly conifers. Much is to be learned about their dispersal and living patterns. The more known about bushy-tailed woodrats and other small forest prey, the more is known about the Northern Spotted Owl upon which many major forest plan decisions are based on.

**05.03.107 A Proteomic Approach to Analyze Novel Interactions of Mcm10 in DNA Damage Repair Pathway**

**Cody, Miller Northeastern State University**

**Ofelia, Patrick Northeastern State University**

Genomic stability must be maintained to avoid the development of cancer. Problems in DNA replication and repair may lead to genome instability. One protein implicated in maintaining genome stability is minichromosome maintenance protein 10 (Mcm10). Mcm10 is a conserved eukaryotic DNA replication factor known to interact with other DNA replication proteins such as Mcm2-7 and PCNA. Preliminary work from our lab has implicated a novel role for Mcm10 in DNA damage repair pathway. The focus of our research is to investigate the interactions of Mcm10 under normal replication and under conditions of DNA damage. Our approach will be to purify Mcm10 from budding yeast and then analyze its novel interactions by mass spectrometry. To accomplish this, we will be over-expressing 6xHis-tagged Mcm10 from a Gal promoter in a protease deficient yeast strain. We will purify the His-tagged Mcm10 by Ni-NTA affinity columns and then check the purity using Coomassie Blue staining and Western blot. The purified Mcm10 will be analyzed for its interactions by mass spectrometry. Ultimately, we would like to analyze interactions in yeast subjected to DNA damage conditions.

**05.03.108 Title: To study the natural evolution in Watermelon mosaic virus (WMV) in Oklahoma. Rajbanshi, Naveen & Ali, Akhtar University of Tulsa**

**Naveen,Rajbanshi** *University of Tulsa*

Cucurbits are economically important vegetables grown extensively in United States and worldwide. Cucurbit varieties like pumpkin, squash, watermelon are highly susceptible to infection by Watermelon Mosaic virus (WMV) and it can have a devastating effect on the yield. The symptoms manifested by the plants infected by WMV are mostly mosaic patterns in leaves, chlorosis, leaf curling and deformation. Due to the presence of RNA as genetic material, the mutation rate is very high in WMV and thereby generating a pool of new strains. Therefore, it is very important to monitor the genetic structure of the virus population before developing any control strategy. The leaf samples used in this study were collected in 2014 growing season from the fields of Tulsa. Coat protein primers were made from the published sequence and used to amplify the coat protein of collected isolates. Based on the coat protein sequence, we constructed the neighbor joining tree and performed phylogenetic analysis

**05.03.110 Using Candida albicans to Provide Visual Aids for the Pleomorphic Characteristics of Fungi**

**Laura,Powell** *University of Central Oklahoma*

**Ralph,Jones** *University of Central Oklahoma*

**Robert,Brennan** *University of Central Oklahoma*

*Candida albicans* is a pleomorphic fungus that produces three growth forms; yeast cells, pseudohyphae, and hyphae. These forms are dependent on pH, temperature, length of exposure, and nutrient source, to name a few. Pleomorphic fungi have the ability to transition into these forms as a mode of self-preservation, which can make opportunistic infections caused by this fungus more difficult to treat; therefore, it is important for students to understand this concept. Some students are visual learners and can comprehend lessons better with the use of visual aids. The objective of this project was to determine a rapid, efficient method to produce a visual aid of the pleomorphic characteristics of *Candida albicans* during a semester to provide better understanding of this characteristic for students in our Pathogenic Microbiology and Immunology course. We addressed this by comparing different media types, at room temperature, 30°C, and 37°C, as well as various environmental conditions for different lengths of time. We hypothesized that the best demonstration of pleomorphic characteristics of fungus would be those grown on TSA in 37°C for 48 hours, then left at room temperature for approximately three weeks; however preliminary results favor nutrient agar, tryptic soy agar, and Sabouraud dextrose agar, at all temperature ranges, in the anaerobic conditions of a candle jar.

### **05.03.111 Next Generation Sequencing of a Mega Plasmid in a *Campylobacter jejuni* Isolated from Retail Chicken Meat Reveals the Presence of Mu-Like Prophage and Multidrug Resistance Genes**

**Daya, Marasini** *University of Tulsa*

**Mohamed, Fakhr** *University of Tulsa*

*Campylobacter* spp are one of the most frequently isolated foodborne bacteria from retail poultry meats. The whole-genome sequencing of *Campylobacter jejuni* previously isolated from Oklahoma retail chicken showed one chromosome of 1,733,718 bp in size. It also showed the presence of a mega plasmid of ~ 85 kb in size that was also detected by PFGE. Libraries were prepared using Illumina Nextera XT and the next generation sequencing was performed in house on a MiSeq sequencer. Genome assembly was done using CLC Genomic Workbench. Annotation was done using RAST. The draft sequence of the mega plasmid was found to be 84,727 bp in size. It appeared as a large pTet like plasmid interestingly carrying some Mu-like prophage genes like the *Campylobacter jejuni* Integrated Element (CJIE) prophage I protein gene, prophage MuSo1, a transcriptional regulator gene, Mu-like prophage FluMu protein gp29 gene, and Mu-like prophage virion morphogenesis protein gene. Interestingly, the plasmid also carried aminoglycoside resistant genes (putative aminoglycoside 6-adenylyltransferase and aminoglycoside phosphotransferase) in addition to the tetracycline resistance tet(O) gene, a streptothricin acetyltransferase gene, and a hygromycin-B-phosphotransferase gene. While Mu-like prophage genes were previously reported in few *Campylobacter* chromosomes, to our knowledge, this is the first report of its presence on a *Campylobacter* large plasmid.

### **05.03.112 Implications of Climate Change and Emerging Parasitic Disease in Loggerhead Sea Turtles (*Caretta caretta*)**

**Kristen, Bliss** *University of Central Oklahoma*

**Yoselin, Elliott** *University of Central Oklahoma*

Parasites may regulate free-living host populations; these interactions often affect the management and limit the recovery efforts of endangered species across many taxa. Mitigating the effects of anthropogenic climate change and preserving biodiversity has become the highest priority of many monitoring and management agencies. Changes in host distribution and abundance could affect parasite assemblages and life history strategies; moreover, environmental stressors such as pollutants and rising temperatures may negatively impact host immunity. The vital relationship between parasites and disease prevalence is complex and often poorly understood; few studies have tracked infectious diseases in marine systems. The Loggerhead sea turtle (*Caretta caretta*) is a species of concern in coastal and marine ecosystems; this species is often used as an indicator of environmental quality and health. Seasonal migration patterns among *C. caretta* present an opportunity to track parasite assemblages across a wide geographic distribution. Our research will specifically target the diversity and prevalence of Helminth parasites found within *C. caretta* at varying latitudes to quantify any significant seasonal or spatial differences. Fecal samples will be obtained and analyzed using light microscopy and compared with published Helminth parasite analyses to determine whether individuals at higher latitudes are less susceptible to parasitism than those subsisting seasonally at lower latitudes.

### **05.03.113 Prevalence, Virulence, and mecA Gene Possession of Staphylococci in Oklahoma Retail Fresh Mushrooms**

**Mohamed,Fakhr** *University of Tulsa*

**Muna,Alharpi** *University of Tulsa*

The objective of this study was to determine the prevalence of staphylococci in both conventional and organic retail mushroom sold in the Tulsa, Oklahoma area. Characterizing the isolated strains for their possession of toxin and mecA genes was also aimed at. A total of 420 samples of retail mushrooms were purchased from retail stores including Asian markets across the Tulsa area. A total of 297/420 of mushroom samples (70.71%) was positive for the presence of Staphylococcus spp. The prevalence of *S. aureus* in the tested mushroom samples was only 2.36%. The mecA gene was detected in 64/297 (21.55%) of the positive samples. A total of 551 isolated Staphylococcal strains were also tested for the presence of 18 toxin genes. The prevalence of enterotoxins ranged from 0.34% to 2.69%. A subset of 120 staphylococcal isolates was subjected to 16S rDNA gene sequencing and was molecularly identified. A total of 10 different Staphylococcus species was detected including *S. aureus*, *S. fleurettii*, *S. saprophyticus*, *S. vitulinus*, *S. sciuri*, *S. xylosus*, *S. succinus*, *S. pasteurii*, *S. warneri*, and *S. haemolyticus*. More than half of the screened *S. fleurettii* strains carried the mecA gene. In conclusion, the prevalence of Staphylococcus spp. in fresh mushrooms is high and a subset of the strains was shown to harbor enterotoxin genes which might lead to foodborne poisoning. Staphylococci other than *S. aureus* may serve as reservoirs for the methicillin resistance mecA gene.

### **05.03.114 Detection and Prevalence of Large Plasmids in Staphylococcus aureus Strains Isolated From Various Oklahoma Retail Meats**

**Leena,Neyaz** *University of Tulsa*

**Mohamed,Fakhr** *University of Tulsa*

*Staphylococcus aureus* is considered as one of the important foodborne bacterial pathogens causing food poisoning. Studies that discuss the characterization of large plasmids of *S. aureus* isolated from retail meat are limited. The objective of this study was to determine the prevalence of plasmids including mega plasmids in *S. aureus* strains isolated from various Oklahoma retail meats. The alkaline lysis method was used to isolate small to medium size plasmids and Pulsed Field Gel Electrophoresis (PFGE) was applied for the detection of large plasmids. Two hundred and twenty three *S. aureus* isolates including MRSA (67 beef, 58 chicken, 42 pork, 27 chicken liver, 22 turkey, and 7 chicken gizzard) were subjected to plasmid isolation with alkaline lysis and PFGE. Using alkaline lysis, 218/223 (97%) of the screened *S. aureus* isolates showed the presence of plasmids ranging in size from 3-60 kb. Using PFGE, 55/223 (38%) of the strains screened showed plasmids  $\geq$  60 kb the majority of which was not detectable using the alkaline lysis method. The highest prevalence of these large plasmids was in the turkey isolates (59%). PFGE was able to detect plasmids > 200 kb in size in 7 *S. aureus* strains. In conclusion, *S. aureus* isolated from retail meats showed a high prevalence rate of plasmids with variable sizes. Also, PFGE can be considered an excellent tool in detecting mega plasmids in *S. aureus* that are not detectable by alkaline lysis.



### **05.03.115 Traditional Chinese Herb Potential Treatment for Cancer**

**Patrice, Samuels** *Northeastern State University*

Abstract: Traditional Chinese culture has been using herbs for thousands of years to cure a wide range of diseases and health issues. *Artemisia annua* (woodworm) plant is one of these herbs that has been studied and found to potentially offer great benefits in the fight against cancer. The extract artemisinin from the plant has been utilized by tagging to be selected for cell apoptosis. Artemisinin has also been shown to inhibit receptors that are associated with angiogenesis, therefore causing cell death of the cancer. It is a hopeful inexpensive fore runner in the race to cure cancer.

### **05.03.116 Effects of pyocin production by *Pseudomonas aeruginosa***

**Dillon, Jones** *Oklahoma State University*

Cystic fibrosis (CF) is an inherited genetic disorder that results in an imbalance of chloride and sodium ions across apical cell membranes in the digestive system and the lungs. The result is thick mucus secretions that clog the lungs and leads to life threatening chronic infections by pathogens such as *Pseudomonas aeruginosa*. *P. aeruginosa* is quite prevalent as it is recovered from nearly 60% of all CF infections and contributes significantly towards morbidity and mortality. Antibiotic treatment rarely clears the bacterial populations from the lungs of CF patients due to increased antibiotic resistance and *P. aeruginosa*'s ability to produce biofilms. The difficulties encountered in treating patients with *P. aeruginosa* infections has increased interest in alternatives to traditional antibiotics and has inspired investigators to search for novel therapeutics. One such alternative includes antibacterial proteins called pyocins, which are produced by *P. aeruginosa* and could be adapted to target other *P. aeruginosa*. Pyocins are potent toxins with a narrow killing range in comparison to antibiotics. The aim of the proposed project is to evaluate the effects of pyocin production by *P. aeruginosa* in a *Drosophila melanogaster* infection model. *D. melanogaster* was infected individually and with mixed *P. aeruginosa* cultures consisting of pyocin producing *P. aeruginosa* and other CF isolates. The survival of *D. melanogaster* was monitored for 14 days. Mixed infections exhibi

## **05.03.117 Sublethal Effects of Three Pesticides on *Apis mellifera* in Turkey**

**Chelsea,Young** *Muhlenberg College*

**John,Barthell** *University of Central Oklahoma*

**John,Hranitz** *University of Central Oklahoma*

**Maria Jose,Pastor** *San Francisco State University*

**Nazmiye,Gunes** *Uludag University*

**Montserrat,Plascencia** *University of California Santa Cruz*

**Shiala,Naranjo** *University of Central Florida*

**Timothy,Salazar** *University of Chicago*

Honey bees are exposed to a variety of insecticides used in apiculture or on crops. Recently, researchers showed that sublethal exposure to neonicotinoid insecticides duplicates Colony Collapse Disorder (CCD) affecting honey bee (*Apis mellifera* L.) populations in the United States and Europe. Sublethal stress models predict CCD due to transport of tainted pollen and nectar concentrated in the hive. Our goal was to test acute sublethal effects of three pesticides, a pyrethroid insecticide (deltamethrin) and two neonicotinoid insecticides (thiacloprid, acetamiprid) on bees in Turkey. We assessed sublethal doses of the three pesticides, at dilutions of the LD50 dose (1/5 LD50 to 1/1000 LD50), on gross motor control and the sucrose sensitivity of the proboscis extension reflex (PER) of honey bees. Both deltamethrin and thiacloprid affected gross motor control at 1/5 LD50 and 1/10 LD50. Deltamethrin and thiacloprid also affected sucrose sensitivity of the PER, with extinction of the PER occurring more frequently at the low sucrose concentrations than the moderate and high sucrose concentrations. In contrast, acetamiprid showed no effect on either gross motor control or sucrose sensitivity of the PER in honey bees. These results support the role of insecticides in the SLS Model of CCD, with the caveat that honey bees are affected by thiacloprid and deltamethrin but acetamiprid appears to be "bee friendly."

**05.03.118 Remote Sensing: Determining Plant and Soil Health Through the use of Infrared Technology**

**BRENDA,ROMERO** *Tulsa Community College*

**EMILY,VICKERS** *Tulsa Community College*

**WYATT,WILSON** *Tulsa Community College*

With today's reality of water scarcity, it is important to grow healthy crops using minimal amounts of water. Utilizing advanced technology such as infrared cameras and Unmanned Aerial Vehicles can assist in optimizing this process. By collecting information with an infrared camera, such as intensity, wavelength, and temperature emitted by the plants and soil, we can more efficiently determine the growth, health, and decay of the plants long before they are visible to the naked eye. We experimented growing Wisconsin Fast Plants in both Martian soil regolith and Earth top soil. When the plants were water stressed, the infrared camera clearly detected the dryness or saturation of the soil. We also examined plants with long, grass-like leaves, in which the infrared camera better revealed the health or decay by detecting damage and dryness of the leaves that would otherwise be difficult to spot. Using a mathematical equation based on the intensity and wavelength emitted, and matching this data with parameters determined by the characteristics of each plant type, we can determine health or decay at its earliest stages. This helps determine optimal watering levels for the soil, in order to prevent waste and promote crop health. This process will ultimately be incorporated in the experiment using remote sensing in UAV's, in order to monitor the health of plants, crops, and soil on a larger scale.

## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

### **05. Mathematics and Science**

#### **04. Botany**

##### **05.04.01 Kamama Community Garden: Research, Community Service, and Cultural Awareness**

**Laurelyn,Rubidoux** *Tulsa Community College*

Tulsa Community College West Campus established the Kamama Community Garden in early spring semester 2014. The objectives of the Garden are to provide research, community service, and cultural awareness for students and the Tulsa community. As a work study / research student, my research and community service experiences are instrumental in the establishment and maintenance of the Garden. This long-term and collaborative project is an extension of the beautification of the West Campus and urban ecology movement in Tulsa.

##### **05.04.02 Isolation Of Antipodal Cells and Gene Expression Analysis In Rice**

**Rashad,Hall** *Langston University*

The embryo sack of a rice plant contains 7 cells all vital for the plants reproduction. The central cell, egg cell, senergent cells, and the antipodal cells. We know the function and purpose of all of these cells except the Antipodal cells. The objective for our research is to gain a better understanding of these cells. We believe the cells may play a similar roll in rice as the vegetative cell does in pollen. RT-PCR and antipodal isolation were the main techniques we used to conduct our research. My results did not match my hypothesis due to the primes I chose to use during RT-PCR. We still don't fully know the function of Antipodal cells.

### **05.04.03 Gender Differences in the Immediate Perception of Violent Scenarios**

*Allison, Statton Southwestern Oklahoma State University*

*Lisa, Castle Southwestern Oklahoma State University*

*Cyclanthera dissecta* (Cucurbitaceae), also referred to as cut-leaf cyclanthera, is a weedy annual vine native to western Oklahoma, USA. A historical lack of interest in this species has led to it being poorly studied even though it is closely related to known edible and medicinal species such as *Cyclanthera pedata* and some agricultural weeds. We have tracked changes in a population of *Cyclanthera dissecta* near Weatherford, Oklahoma, located in the western part of the state, for five years to determine the baseline population size and the effect of inconsistent weather conditions on this plant. We compare population size, average plant size, average number of fruit per plant, and each plant's geographical location for the five growing seasons. We utilize this information alongside environmental factors, such as droughts and early freezes, to better understand how climate change and human activity may influence plant growth and survival.

### **05.04.04 Isolation of Mature Antipodals in *Oryza sativa* to Determine the Function Through Gene Expression**

*Jasmene, Abernathy Langston University*

*Oryza Sativa*, better known as rice is a model cereal. It is the most important field crop because it feeds half the world. Rice is the preferred crop for this research because it has the fastest time from pollination to fertilization of thirty minutes. The objective is to better understand the function of antipodals. We isolated the antipodals using forceps and did gene expression using RT-PCR to conduct our research. My results were positive based on my RT-PCR and the primers I chose. Although my gene showed positive results we still don't know the exact function of antipodals.

### **05.04.05 Optimizing Protocols for Measurement of Ion Leakage and Chlorophyll Content in Dark Stressed Plants.**

*Rashad, Hall Langston University*

Abiotic stress adversely affects plant growth. Determining membrane permeability as a result of environmental stresses, growth and development, and genotypic difference is accomplished by measuring solute leakage from plant tissue. We hypothesized that greater leakage would occur with increased light deprivation. We did our original experiments with wild type *Arabidopsis thaliana* and a mutant deficient in lipoxygenase and subsequently employed *Trigonella foenum-graecum*. Plants were grown in soil for three weeks and then placed in the dark. Ion leakage was measured at zero hours, six hours, and 24 hours post darkness. Similar sized leaves were rinsed with deionized water, and immersed in 25 mL of deionized water for 4 h with shaking at 100 rpm. The conductivity of the solution was measured with an Oakton CON 510 Series conductivity meter. These samples were then autoclaved, and conductivity was measured again. Relative ion leakage of the autoclaved was calculated. We repeated these steps for each time period and obtained two measurements for each. Acetone extractions of chlorophyll and chlorophyll measurements of samples subject to the same conditions (including sampling time) were also carried out. We discuss the effects of light stress on ion leakage and chlorophyll content in *T. foenum-graecum*.

#### **05.04.06 Optimizing Protocols for Measurement of Ion Leakage and Chlorophyll Content in Dark Stressed Plants.**

**Rashad,Hall** *Langston University*

Abiotic stress adversely affects plant growth. Determining membrane permeability as a result of environmental stresses, growth and development, and genotypic difference is accomplished by measuring solute leakage from plant tissue. We hypothesized that greater leakage would occur with increased light deprivation. We did our original experiments with wild type *Arabidopsis thaliana* and a mutant deficient in lipoxygenase and subsequently employed *Trigonella foenum-graecum*. Plants were grown in soil for three weeks and then placed in the dark. Ion leakage was measured at zero hours, six hours, and 24 hours post darkness. Similar sized leaves were rinsed with deionized water, and immersed in 25 mL of deionized water for 4 h with shaking at 100 rpm. The conductivity of the solution was measured with an Oakton CON 510 Series conductivity meter. These samples were then autoclaved, and conductivity was measured again. Relative ion leakage of the autoclaved was calculated. We repeated these steps for each time period and obtained two measurements for each. Acetone extractions of chlorophyll and chlorophyll measurements of samples subject to the same conditions (including sampling time) were also carried out. We discuss the effects of light stress on ion leakage and chlorophyll content in *T. foenum-graecum*.

## Abstracts from the 2015 Oklahoma Research Day

### Held at Northeastern State University

#### 01. Mathematics and Science

#### 05. Chemistry

##### 05.05.01 Insight into the Inhibition of metallo-beta-lactamase from *Bacillus anthracis*

**Joshua, Watie** *Northeastern State University*

**Sung-Kun, Kim** *Northeastern State University*

Whenever bacteria develop a resistance to antibiotics, it is important to find a way to bypass or negate the bacteria's resistance. In this research, the bacteria *Bacillus anthracis*, causing anthrax, has developed a metallo-beta-lactamase (Bla2), which destroys the beta-lactam antibiotics such as penicillins, cephalosporins, monobactams, carbapenems. In order to resolve this issue, two newly synthesized compounds, compound 4 and compound 7, have been used to see if they can inhibit Bla2. Our previous results showed that the compound 7 has its ability to inhibit Bla2 effectively. To understand the interaction between the compound and Bla2, molecular docking programs were used - AutoDock 4 and AutoDock Vina. The molecular dockings were examined and compared to determine which of the results would be best to explain how the compound binds to Bla2. From these results, we confirmed that compound 7 binds to the active site of the enzyme. This observation is consistent with the experimental results.

##### 05.05.02 A Computational Study of Electron Donating and Electron Withdrawing Substituents on Phenazine and Dibenzo-[b,i]Phenazine

**Daniel, McInnes** *East Central University*

**Kayle, DeNike** *East Central University*

N-substituted polycyclic aromatic hydrocarbons are proposed for use as organic solid state transistors or switches. Simple molecules of this sort include phenazine and dibenzo[b,i]phenazine. This study examines the band gaps of these molecules after substitution of electron withdrawing and electron donating substituents. The most effective substituent in lowering the band gap for phenazine was the electron donating isopropyl group. This group produced a band gap of 0.09087. For dibenzo[b,i]phenazine, the electron withdrawing substituent -OCF<sub>3</sub> was most efficient, producing a band gap of 0.07080.

### **05.05.03 SIMPLE SOL-GEL SYNTHESIS OF ANTIMONY DOPED TIN OXIDE THIN FILMS**

**John,Dale** *East Central University*

A sol-gel method was established and used to prepare thin films of antimony doped tin oxide (ATO). The ATO was prepared by dissolving SbCl<sub>3</sub> and Sn separately in aqua regia. The two solutions were combined and the PH was lowered. Ethylene glycol was added and the solution was stirred for 12 hours then washed with ethanol till Cl free. The precipitate was suspended in ethanol. Films were made by depositing the ATO sol-gel to microscope slides and annealing the slides in air at 500 °C for 3 hours. Typical film thickness is approximately 1µm. The purpose of preparing these films was to examine the effects of thermal and electro-thermal annealing followed by hydrogenation on the resistance of ATO. Thus far thermal annealing of slides results in a sheet resistance 132KΩ. The results indicate that this sol-gel based method of producing ATO films can be used in producing optoelectronic devices.

### **05.05.04 Characterization of DMID, an Isoflavonoid Pathway Enzyme, via Interactions With Vestitone Reductase**

**Abe,Blackburn** *Southeastern Oklahoma State University*

**James,Sharp** *Southeastern Oklahoma State University*

**Nancy,Paiva** *Southeastern Oklahoma State University*

**Tyler,Shannon** *Southeastern Oklahoma State University*

Isoflavonoids benefit human health by acting as antioxidants or mild phytoestrogens reducing heart disease, osteoporosis, and cancer rates. All enzymes leading to pterocarpan (a class of isoflavonoids) have been cloned except for DMID [7,2'-dihydroxy-4'-methoxy-isoflavanol (DMI) dehydratase]. DMID was discovered as the final enzyme leading to pterocarpan, and was demonstrated to exhibit weak protein-protein interactions with the preceding enzyme VR (vestitone reductase). Our goal is to use protein-protein interactions and new protein techniques to isolate enough DMID or partial sequence to allow its eventual cloning and characterization. Alfalfa seedlings were grown and treated according to published methods. The levels of VR in protein extracts were assessed using SDS-PAGE and Western blotting using anti-VR antiserum. Crude protein extracts were concentrated using centrifugal filtration, and an attempt was made to purify or enrich VR and DMID using co-immunoprecipitation. We are improving upon a previous method by using Protein G-magnetic Dynabeads in place of Protein A-red agarose. We have established methods for producing protein extracts containing high levels of VR, and these should also be a good source of DMID. We are continuing our DMID purification efforts by finding an appropriate ratio of beads, antibody, and protein extract before scaling up.



### **05.05.05 Effects of Laser Immunotherapy on Hormone Secretion in the Pancreas Following Treatment for Pancreatic Cancer**

**Erica, Halterman** *University of Central Oklahoma*

Laser immunotherapy has been shown to help treat and destroy tumors and metastasis in both breast and skin cancer and is now being applied to pancreatic cancer as well; however, it has not been tested as treatment of pancreatic cancer and the effects it will have are unknown. Hormones are produced within the pancreas and secreted by the endocrine gland that are vital to cell productivity and life. I am proposing a study to investigate and observe the effects that laser immunotherapy has on the hormone levels produced in the pancreas, specifically insulin, and whether or not treatment will decrease the production of these hormones both during and after treatment. By monitoring the productivity of the pancreas during and after treatment, it can be determined whether the treatment is able to cure the cancer while leaving the pancreas to continue its role in the body unharmed.

### **05.05.06 Use of Oscillatoria limnetica lipids as salinity proxies**

**Phillip, Murray** *Northeastern State University*

Salinity of water bodies is related to the rates of precipitation and evaporation. Salinity proxies have been used to study precipitation patterns and climate variability. Currently D/H and O18 proxies are used for paleoclimate reconstruction and climate variability prediction. However due to systemic errors associated with these proxies, there is a necessity for development of new proxies. In this project, we propose use changes to the lipid composition of *Oscillatoria limnetica* at different salt concentrations as a salinity proxy for paleoclimate reconstructions in regions where precipitation patterns constitute a major feature of climate variability. *O. limnetica* is a halophilic cyanobacterium that can grow at saturated salt concentrations, alkaline pH, and 47°C. Our interest in *O. limnetica* is based on the following: (i) *O. limnetica* is among the most halophilic organisms known. (ii) Despite the extreme halophilicity, *O. limnetica* grows at broad range of salt concentrations. (iii) Chemical composition of *O. limnetica* lipids have been identified and changes in this composition in response to salt concentration were analyzed using GC/MS.

### **05.05.07 Solvent Diffusion from Polymer Solutions with Lyotropic Liquid Crystalline Capability**

**Brittney, Rogers** *Northeastern State University*

**Carl, Aronson** *Northeastern State University*

Thin films of poly(n-alkyl isocyanate) solutions were juxtaposed against air in a diffusion couple geometry at room temperature. The solvent was allowed to diffuse away and evaporate from the solution in a controlled manner. The diffusion couple geometry produced a uniform film for optical assessment of liquid crystalline potential between crossed polarizers. After an induction period, a stable microstructure developed in which the interior of the sample remained isotropic followed by a liquid crystalline band, with characteristic disclination defects and texture, followed by a crystalline band nearest to the external surface. The width of the total characteristic birefringent band was measured over time and provided information concerning the dynamics and trajectory of solvent transport and evaporation from the cover slip edge. The apparent solvent diffusion coefficient for each system was measured at room temperature as a function of initial polymer concentration. Consequences for concentrated biological macromolecular systems possessing lyotropic capability are discussed with respect to the concentration dependence of solvent diffusion observed herein.

## **05.05.08 Consequences of Steric Mismatch on Tg Composition Dependence**

**Carl, Aronson** *Northeastern State University*

**William, Brewer** *Northeastern State University*

An investigation of phenolic functional group accessibility in hyperbranched poly(4-hydroxystyrene) (PHS-B) is presented. The phase behavior and extent of hydrogen bonding in blends of either PHS-B or linear PHS with hydroxypropylcellulose (HPC), a complimentary Lewis basic polymer, were calculated from glass transition temperature (T<sub>g</sub>) enhancements measured using differential scanning calorimetry (DSC) techniques. The effects of local steric screening and overall steric mismatch as well as the thermodynamic competition between inter-molecular and intra-molecular hydrogen bonding are discussed with respect to the observed miscibility and compositional dependence of blend T<sub>g</sub>. An extension to literature equations applicable to conventional, symmetric polymer blend T<sub>g</sub> composition dependence is presented in order to model asymmetric T<sub>g</sub> composition dependence. Modeling utilized an extrapolated blend composition wherein linear and parabolic behaviors coalesced. Furthermore, the effect of varying the Lewis base linear polymer molecular weight on the hydrogen bonded PHS-B fraction is discussed with respect to the free energy of mixing polymers from Flory-Huggins theory. PHS-B/HPC blend data helped begin to establish a new molecular architecture-functional group accessibility property relationship for use with the design of functionalized hyperbranched synthetic macromolecular targets.

## **05.05.09 An Amperometric Biosensor for Glucose Determination Using ortho-Nitroaniline and Carbon nanotube Modified Microelectrode**

**Jude, Abia** *Northeastern State University*

**Taimoor, Khan** *Northeastern State University*

In this study, an amperometric glucose micro-biosensor with immobilization of glucose oxidase on electrochemically polymerized ortho-nitroaniline/multi-walled carbon nanotubes (PoAN/CNT) films has been accomplished via the entrapment technique. Electropolymerization of ortho-nitroaniline on the surface of the 10micron Pt electrode was carried out at constant potential (0.75 V, vs. Ag/AgCl) using an electrochemical cell containing ortho-nitroaniline, glucose oxidase, and multi-walled CNT. The working conditions for preparing the film was optimized and effects of temperature, pH and operational stability were investigated. Quantification of glucose was carried out by the oxidation of enzymatically produced H<sub>2</sub>O<sub>2</sub> at 0.4 V vs. Ag/AgCl. The micro-biosensor showed a fast response time of 2.0s, a glucose calibration detection limit of  $5.8 \times 10^{-8}$ M, 98% of initial activity was retained after 30 days (when stored in 0.1 M phosphate buffer solution at 4 °C), and no significant interference from L-ascorbic acid, uric acid, and acetaminophen.

**05.05.10 Low cost synthesis and analysis of graphene and the effect of adsorption of organic compounds with structure.**

**Barry,Lavine** *Oklahoma State University*

**Evan,McIntyre** *University of Central Oklahoma*

**John,Bowen** *University of Central Oklahoma*

**Kelsie,Magiera** *University of Central Oklahoma*

**Keith,Jackson** *University of Central Oklahoma*

**Tye,Chapman** *University of Central Oklahoma*

A low-cost synthesis of graphene, derived from the Hummers and Offeman method was developed. A commercial grade graphite lubricant was exfoliated with concentrated acid, oxidized by permanganate to produce graphene oxide (GO) This was then reduced using hydrazine hydrate to produce graphene. Products were analyzed using Raman Spectroscopy and SEM. Both species were used to observe the effect of structure of various organic species on absorption in water. The adsorption was analyzed by difference using solid phase micro extraction (SPME) and gas chromatography mass spectrometry.

**05.05.11 Analysis of leaching of dibutyl phthalate from a commercial faucet hose into water using solid phase microextraction (SPME) and Gas Chromatography Mass Spectroscopy (GC MS)**

**Dalton,Lewis** *Edmond North HS*

**Erin,Brooks** *H.S. Homeschool*

**F.,Albahadily** *University of Central Oklahoma*

**Juliette,Chisam** *Edmond North HS*

**John,Bowen** *University of Central Oklahoma*

**Justin,Westhover** *H.S. Homeschool*

**Luis,Figueora** *University of Central Oklahoma*

**Shawna,Ellis** *University of Central Oklahoma*

**Thomas,Briscoe** *University of Central Oklahoma*

Various Phthalate Esters are used as plasticizers in commercial plastics and are known to leach into drinking water. Some are also implicated as endocrine disruptors. For this study, a common flexible plastic faucet hose was purchased from a hardware store, and analyzed using SPME-GCMS using an internal standard. Timed samples of deionized water were exposed to the hose, and quantitated for dibutyl phthalate concentration. Several internal standards were synthesized and used for this study.

## **05.05.12 Playing to Our Strengths: Helping Students Get the Most of a PUI Education in Chemistry**

**Cheryl, Frech** *University of Central Oklahoma*

**Luis, Montes** *University of Central Oklahoma*

The University of Central Oklahoma (UCO) Chemistry Department has 200 chemistry majors with a range of post-graduation goals. A small percentage of these students end up in graduate programs in the chemical sciences each year. We have identified several factors that correlate with students' eventual success in a graduate program. These include: participation in undergraduate research, either in the department or in a summer REU, active membership in the department Chemistry Club, attendance at a regional or national chemistry meeting, and a successful mentoring relationship with one or more department faculty. We will discuss current preparation of our majors and share some advice from successful students.

## **05.05.13 Development of a microfluidic immunological assay for the detection and identification of Bluetongue virus and EHDV induced antibodies in serum.**

**Barry, Lavine** *Oklahoma State University*

**F., Albahadily** *University of Central Oklahoma*

**Jane, Jarshaw** *University of Central Oklahoma*

**John, Bowen** *University of Central Oklahoma*

**Mary, Tappert** *University of Central Oklahoma*

**Robert, Brennan** *University of Central Oklahoma*

**William, Wilson** *USDA*

This study describes the development and testing of a microfluidic immunological assay that combines lateral flow assay and microfluidic paper-based analytical device designs for the purpose of detecting and identifying antibodies in serum from sheep exposed to Bluetongue Virus and/or EHDV. Initial design research was done using BSA and anti-BSA to mimic the actual target antibody/antigens. The final assay design will use BTV or EHDV proteins as antigen and animal serum as primary antibody, with antigen-antibody binding detected by a fluorophore- or gold nanoparticle-labeled secondary antibody. We here describe the stepwise optimization of antigen binding, antibody flow, and complex detection in a microfluidic system.

#### **05.05.14 Electrochemical Properties of Graphene Absorption**

**F.,Albahadily** *University of Central Oklahoma*

**John,Bowen** *University of Central Oklahoma*

**Yushi,Zang** *University of Central Oklahoma*

Reduced graphene oxide was prepared and formed into a specially constructed form with electrodes on either end. Conductance and current were observed as phthalate esters were adsorbed onto the surface.

#### **05.05.15 SYNTHESIS OF ENAMINONES USING COPPER AS A CATALYST**

**Arpan,Pal** *University of Tulsa*

**Erika,Lopez** *University of Tulsa*

**Syed,Hussaini** *University of Tulsa*

Enaminones are synthetic intermediates in organic synthesis that contain the N-C=C-C=O functional group. These compounds are useful in the development of pharmaceuticals. Although the biological activity of enaminones is not well-documented, enaminones have currently come under investigation because of their therapeutic potential. Recently, our research group has found a ruthenium catalyzed method for the synthesis of enaminones. This project uses a copper catalyzed method for the synthesis of enaminones. Copper (II) bromide was investigated for the coupling of a diverse group of thioamides and diazo compounds. Temperature and time were screened and the catalyst was found to give 100% conversion of several thioamides into the corresponding enaminones at 90 °C using dichloroethane as a solvent. Copper (II) bromide shows a broad substrate scope in the synthesis of enaminones. By using a copper catalyzed method, the reaction has become more economical.

#### **05.05.16 Determining concentrations of Copper, Iron, and Zinc by standard addition using Flame Atomic Absorption Spectrophotometry**

**daniel,montalvo** *University of Central Oklahoma*

Amounts of zine, copper and iron in randomly collected hair samples were investigated. The analysis was based on data collected using the standard addition method in conjunction with Flame Atomic Absorption Spectroscopy. Hair samples were digested with nitric acid appeared to show significantly higher concentratios of zinc and iron (n 30% higher)compared to hair samples digested in nitric acid and 30% hydrogen peroxide. Amount of copper in the hair samples were below limit of detection for the instrument used and hence was not determined.

## **05.05.17 Cu-Bicyclen as a DNA Cleavage Component for use in Artificial Nucleases**

**Lori,Gwyn** *Southwestern Oklahoma State University*

**Sequojah,O'Neal-Johnson** *Southwestern Oklahoma State University*

**Tim,Hubin** *Southwestern Oklahoma State University*

Antibiotic resistant bacteria such as Methicillin (MRSA) and Vancomycin (VRSA) resistant Staph. aureus have proven to be lethal. A possible alternative to developing new antibiotics is to synthesize artificial nucleases to attack the genes of antibiotic resistant bacteria. Nucleases are enzymes that hydrolyze (cleave) phosphodiester bonds in the backbone of nucleic acids. Binding specificity of naturally occurring nucleases ranges from non-specific to very specific. For this project, an engineering approach was used to make modular artificial nucleases with differing DNA specificities and DNA cleavage rates. In general, nucleases have a DNA cleaving and DNA binding domain. Metal-chelates are compounds that have been shown to exhibit some nonspecific DNA cleavage activity. In this study, the DNA cleavage activity of  $[\text{Cu}(\text{C}_{12}\text{H}_{26}\text{N}_4)(\text{H}_2\text{O})(\text{C}_2\text{H}_3\text{O}_2)](\text{PF}_6)$  (Cu-Bicyclen) was measured under varying conditions (incubation time, metal chelate concentration, and pUC19 DNA concentration). Fe-EDTA, known for its DNA cleavage activity, was used as a control to compare to Cu-Bicyclen. Preliminary data indicate that Cu-Bicyclen may cleave DNA but its activity is much weaker than that of Fe-EDTA. Future work will include designing a specific DNA binding domain (including the use of TAL effectors) aimed at the nuc gene of Staph. aureus (a gene that codes for an infectious protein agent).

## **05.05.18 The metal chelate Cobalt Bicyclen as a Potential DNA Cleavage agent for Artificial Nucleases**

**Lori,Gwyn** *Southwestern Oklahoma State University*

**Megan,Oertel** *Southwestern Oklahoma State University*

**Tim,Hubin** *Southwestern Oklahoma State University*

Methicillin resistant Staphylococcus aureus, commonly known as MRSA, is a strain of bacteria that is resistant to most antibiotics. This can pose a problem in the medical community when the antibiotics used to treat often fatal bacterial infections no longer work. One idea to incapacitate this infection is to specifically target sequences of infectious genes such as SaeR in the MRSA genome. To do this, enzymes known as nucleases can be designed to specifically target the phosphodiester bonds of the genes in the bacteria's genome. Our approach in engineering an artificial nuclease is to first test the hydrolysis activity of different metal chelates. Previous research has shown that small molecule metal chelates such as Fe-EDTA catalyze this type of reaction. The metal chelate,  $[\text{Co}(\text{C}_{12}\text{H}_{26}\text{N}_4)\text{Cl}_2](\text{PF}_6)$  (referred to as Co- Bicyclen), was tested as a potential nuclease candidate by incubating the Co-Bicyclen with the pUC19 plasmid at room temperature in a solution of 100  $\mu\text{M}$  HEPES, 100  $\mu\text{M}$  ascorbate, and varying concentrations of 3% hydrogen peroxide. Preliminary results indicate that Co-Bicyclen shows nuclease activity under these conditions. Further assays will be conducted by varying other conditions to determine a mechanism for the reaction. Future goals include designing DNA binding domains such as TAL effectors to build an enzyme with specific DNA binding affinity.

## **05.05.19 Proliferation Assay in Tension-Free and Tension-Maintaining Skin Equivalents**

**Cory,Anderson** *University of Central Oklahoma*

**Melville,Vaughan** *University of Central Oklahoma*

**Mona,Hilal** *University of Central Oklahoma*

As cell proliferation is key to many biological processes, such as wound healing and cancer development, it is important to perform proliferation assay that allows the determination of the number of cells growing and dividing. Cell proliferation can be affected by different internal and environmental factors. The goal of this study was to determine the effect of mechanical tension on proliferation by performing proliferation assays for tension-free and tension-maintaining skin equivalents. The engineered tissue was prepared by developing a dermal equivalent of normal human fibroblasts and type I collagen mixture and then plating the combination 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 sectioning. DNA synthesis was detected based on the incorporation of 5-ethynyl-2'-deoxyuridine (EdU) into cellular DNA during DNA replication and the reaction of EdU with a fluorescent azide that allows the proliferated nuclei to become fluorescent green when detected through fluorescence microscopy. Preliminary quantification of the data demonstrated that proliferation was present in the dermal compartments of both the tension-free and the tension-maintaining tissue, with the tension dermis exhibiting greater proliferation than the tension-free dermis.

## **05.05.20 Quenching of Cyanoaromatics Fluorescence and Aromatic Carbonyl Triplets by Model Sulfur Compounds**

**Hunter,Wurtz** *Cameron University*

**Paritosh,Das** *Cameron University*

Sulfur-bearing moieties play significant roles in various processes of interest to biology, agriculture, industry, and environmental pollution. The multifarious functions of S are made possible by the numerous oxidation states in which the element can exist, including some that are capable of facile redox interconversions. We have investigated several model organosulfur compounds for their charge-transfer interactions as donors with photoexcited singlet states of three cyanoaromatics, namely, 1,2,4,5-tetracyanobenzene (TCB), 1,4-dicyanonaphthalene (DCN), and 9,10-dicyanoanthracene (DCA) and with triplet excited states of aromatic ketones (e.g., benzophenone). This paper will present and examine kinetic data on the quenching of steady-state fluorescence of cyanoaromatics by several thiols, sulfides and disulfides and on the quenching of ketone triplets by several thiols (studied by nanosecond laser flash photolysis). In addition, the data on the efficiency of hydrogen transfer from thiols to ketone triplets will be presented.

### **05.05.21 Analysis and Comparison of Bio diesel and Diesel Used as Fire Accelerants**

**Rumer, Rodne** *University of Central Oklahoma*

Fires can occur unintentionally (accidental), occur naturally, or be intentionally started which is arson. No matter how the fire occurred, it can destroy a lot of property as well as cost humans their lives, which makes it hard to investigate how a fire was started. Often in the case of arson a fire accelerant is used to help spread the fire and collection of debris from the fire is important as traces of the fire accelerant could be detected in the debris. In this study biodiesel and diesel were used as fire accelerants to start fires and the debris from those fires was used to see if the fire accelerant could be determined using a carbon strip and Gas Chromatography- Mass Spectrometry (GC-MS). It was hypothesized there would be similarities between biodiesel and diesel as they have similar chemical properties however differences would be seen as they are two different fuels. The results from the GC-MS of both accelerants were analyzed and then compared against each other. The results showed that while biodiesel and diesel shared common characteristics which are typically seen in hydrocarbons in general, it was found that the two were different from each other. This information can be used in the criminal aspect as it can tell investigators what started the fire in an arson crime if an arsonist used biodiesel or diesel or eliminate the two as possible fire accelerants.

### **05.05.22 Progress Towards the Synthesis of 1 $\alpha$ -Hydroxyvitamin D5**

**Dragos, Albinescu** *Northeastern State University*

This research project presents the progress towards the convergent synthesis of 1 $\alpha$ -hydroxyvitamin D5, a new, highly potent cancer chemopreventive agent, and also an effective inhibitor of renin gene expression. This vitamin D analog was able to reduce the tumor incidence up to 47% and tumor multiplicity up to 50% in chemically-induced mammary carcinogenesis experiments in rats. The convergent synthesis involves the copper (I) mediated coupling reaction of two independently synthesized fragments, namely, a vitamin D5 side chain, as a Grignard reagent, and a 1 $\alpha$ -hydroxylated core vitamin D structure (triene system), as a tosylate. The side chain was synthesized via an asymmetric alkylation of 3-butenic acid esterified with a chiral auxiliary (R-binaphthol) and the "triene" system was generated from vitamin D2, via a vitamin D2 sulfur dioxide adduct. This convergent synthesis is designed to offer a better synthetic alternative to the current linear synthetic pathway.



### **05.05.23 Subcloning and Characterization of *S. cerevisiae* aromatic aminotransferase**

**Andrew,Rutter** *University of Oklahoma*

**Christian,Fleming** *University of Central Oklahoma*

**lilian,Chooback** *University of Central Oklahoma*

**Russell,Evans** *University of Central Oklahoma*

**Sidra,Mesiya** *University of Central Oklahoma*

**William,Karsten** *University of Oklahoma*

The  $\alpha$ -aminoacidate pathway for the biosynthesis of lysine in *Saccharomyces cerevisiae* is not present in humans; therefore, enzymes in the pathway are potential candidates for drug development for fungal infections. The fourth step in the pathway is catalyzed by an aminotransferase which converts  $\alpha$ -ketoacidate to L- $\alpha$ -aminoacidate. Based upon sequence homology 2 enzymes in *S. cerevisiae* is identified to be a good candidate for the aminotransferase in question, Aro8 and Aro9. The Aro8 gene has been cloned and characterized. Currently, we have cloned the gene for aromatic aminotransferase 9 (Aro9) into the expression vector PET16b. The protein expression, purification and characterization of the protein were performed. The protein is expressed poorly. Based upon this result, the gene for Aro9 is sequenced to verify the integrity of the gene and the presence of histidine tag. Based upon the result the clone will be modified to produce higher concentration of the protein. Kinetic studies of the pure enzyme will follow.

### **05.05.24 Organic Synthesis of Potential Inhibitors for Dihydrodipicolinate Synthase**

**Christian,Fleming** *University of Central Oklahoma*

**lilian,Chooback** *University of Central Oklahoma*

**Russell,Evans** *University of Central Oklahoma*

**William,Karsten** *University of Oklahoma*

Dihydrodipicolinate synthase (DHDPS) catalyzes the formation of dihydrodipicolinate from pyruvate and aspartate- $\beta$ -semialdehyde (ASA). This reaction is the first committed step in the lysine biosynthetic pathway in bacteria and some plants. The absence of such a pathway in humans has made DHDPS an interesting target for novel drugs. Inhibitors of DHDPS are believed to contain antibiotic properties. Based upon this, 2-hydroxy-4-oxobutanoic acid and 4-hydroxy-2-oxoheptanedioic acid have been designed and will be synthesized. Kinetic studies of the inhibitors will be performed to investigate the mode of inhibition.

## **05.05.25 FISCHER ESTERIFICATION BY MICROWAVE IRRADIATION USING VARIOUS ALCOHOLS (OR CHEMISTRY DOESN'T HAVE TO STINK)**

*Jessica,Cheng Northeastern State University*

*Spence,Pilcher Northeastern State University*

In today's world of instant coffee, instant meals, and instant messaging, undergraduate students prefer not to have to wait long periods of time for an organic reaction to take place. Heating with microwaves is rapidly becoming more commonplace due to dramatically reduced reaction times and higher product yields. Many experiments that are commonly performed in the organic II laboratory course require heating times of one hour. One such reaction is the Fischer esterification where a carboxylic acid is heated with an alcohol in the presence of an acid catalyst producing an ester. In the past, the organic chemistry lab at NSU performed a Fischer esterification by heating benzoic acid with excess methanol producing methyl benzoate with an average yield of 53%. In this work, a procedure was developed using microwave irradiation as the heat source in which glacial acetic acid was heated with 15 different alcohols separately resulting in a variety of different products. Each product was obtained after a reaction time of only 5 minutes heating at 120°C. Yields for the products ranged from 32%-79%. The developed procedure will be introduced in the organic II laboratory curriculum at NSU for the first time during the Spring 2015 semester. Students will be assigned an alcohol at the start of the laboratory period, will perform the reaction, calculate the percent yield and compare to other reactions that were performed in class, and then try and identify the odor of

## **05.05.26 Opioids and Non-Steroidal Anti-Inflammatory Drugs in biological function Faculty Advisor : A.K.Fazlur Rahman**

*Allen,Chen Oklahoma School of Science and Mathematics*

This presentation will discuss our understanding of pain killers and its biological action. Pain killers work through a variety of functions, including prostaglandin inhibition and the activation of opioid receptors in the nervous system. Non-Steroidal Anti-Inflammatory Drugs are the most common, mainly inhibiting the action of cyclooxygenase enzymes, which are involved in provoking pyretic and inflammatory responses from the body. Since they all have a similar function, their side effects also share similarities, mainly arising from the inhibition of cyclooxygenase. Opioids, which are drugs that interact with the nervous system and affect the brain's response to pain, are the other main category of painkillers. Since they actually interact with the brain, they can be extremely addictive and habit-forming, but also can sometimes be the only form of effective treatment available for a patient. The purpose of this paper is to investigate the link between the chemical structure of these molecules and their medical functions.

## **05.05.27 (Unnamed)**

*A.K.Fazlur,Rahman Oklahoma School of Science and Mathematics*

*Tina,Wu Oklahoma School of Science and Mathematics*

This presentation describes the usage of precious metals in medicine. platinum complexes are known to treat cancer due to its ability to prevent the division of living cells. Silver complexes interrupt the ability of bacteria cells to form bonds which causes the bacteria to fall apart. Gold nanoparticles have recently been found to be effective, in the treatment of cancer. Further research with precious metal nanoparticles may lead to effective cure for cancer in the near future.

### **05.05.28 Structure Determination of the Siderophore: Rhodotorulic Acid**

**Mariah, Penland** *Northeastern State University*

Iron limitation is a major factor influencing the growth of microorganisms, from infection of a mammalian host (where iron is tightly controlled by protein complexation) to aquatic and marine environments (where iron is not soluble or is complexed by organic ligands). Many microorganisms produce low-molecular-weight, iron(III)-specific chelators called siderophores to compete for iron. The objectives of this project are to identify novel siderophores produced by different marine-derived fungal strains and to evaluate them for use as antimicrobial or antineoplastic agents. Marine fungal strains were evaluated for siderophore production using an iron-dye containing agar. Siderophore-producing strains were cultured in artificial seawater broth, the iron-binding compounds were isolated by RP-HPLC, and the purified compounds were analyzed by mass spectrometry. The final structure determination was made by NMR ( $^1\text{H}$ ,  $^{13}\text{C}$ ,  $^1\text{H}$ - $^1\text{H}$  COSY, and HMBC). The siderophore produced by *Sporidiobolus salmonicolor* 05-001 was found to be rhodotorulic acid.

### **05.05.29 Investigating Room Temperature Ionic Liquid Recovery**

**Jody, Buckholtz** *Northeastern State University*

**John, Moore** *Northeastern State University*

This project seeks to characterize the effect of chemical hydrolysis of cellulose on the solvent, 1-Methyl-3-Octylimidazolium Chloride, by proton NMR. Additionally, data for recovered dry mass of cellulose and fermentable sugar concentration in the hydrolysis solution were also collected. While discoloration of the solvent was seen, there were no changes in structure detected. A total of 3 hydrolysis reactions were carried out in series and then replicated several times. There was an average of 12% loss of cellulose per reaction.

### **05.05.30 Application of Silver, Gold, and Platinum complexes in Medicine : An Educational Study**

**Tina, Wu** *Oklahoma School of Science and Mathematics*

This review summarizes the uses of silver, gold, and platinum complexes and nanoparticles in medicine. The use of metals in medicine was unknown or limited in the ancient world. In the field of medicine, metals are most commonly used in complexes or as nanoparticles. When used in complexes, the compounds attach to various ligands in the body to serve different functions. Most notably, platinum complexes were developed to treat cancer due to its ability to prevent the division of living cells. Similarly, silver complexes interrupt the ability of bacteria cells to form bonds which causes the bacteria to fall apart. Beginning in the 20th century, developments were made in the field of nanomedicine and the use of nanoparticles. While silver nanoparticles are relatively inert, gold nanoparticles were found to be very effective, especially in the treatment of cancer. With the knowledge of both complexes and nanoparticles, further research could lead to the discovery of effective cures for cancer.

**05.05.31 Stem Education Enhancement in Oklahoma : Teaching Chemistry to 4th and 5th Grade Elementary Children by High School Students**

**A.K.Fazlur,Rahman** *Oklahoma School of Science and Mathematics*

**Angela,Zhao** *Oklahoma School of Science and Mathematics*

**Nathan,Wu** *Oklahoma School of Science and Mathematics*

**Tina,Wu** *Oklahoma School of Science and Mathematics*

As part of our Chemistry education enhancement program at the Oklahoma School of Science and Mathematics to promote science education to elementary schools across the State of Oklahoma we have launched a " Science is Fun " program to teach science 4th, 5th and 6th grade students by the 11th, 12th grade gifted OSSM students . This program is funded for a year by Dreyfus Foundation. In all these demonstrations we have used power point presentations, visual teaching using molecular models and science experiments to entertain and teach the students basic scientific concepts. We have accomplished our goal given the treacherous weather during the last spring semester and later part of the fall semester. In class session was about 50-60 mins . In most cases classes were held in the school auditorium to accommodate 120-150 students. In all cases, in each school two students taught each session. Four elementary schools were visited this year and 14 student's teachers taught about 950 students.

**05.05.32 Teaching Chemistry to 4th and 5th grade Elementary Students : STEM Educational Enhancement in Oklahoma**

**A.K.Fazlur,Rahman** *Oklahoma School of Science and Mathematics*

**Jane,Chin** *Oklahoma School of Science and Mathematics*

**Nathan,Yu** *Oklahoma School of Science and Mathematics*

**Sooraj,Boominathan** *Oklahoma School of Science and Mathematics*

As part of our Chemistry education enhancement program at the Oklahoma School of Science and Mathematics to promote science education to elementary schools across the State of Oklahoma we have launched a " Science is Fun " program to teach science 4th, 5th and 6th grade students by the 11th, 12th grade gifted OSSM students . This program is funded for a year by Dreyfus Foundation. In all these demonstrations we have used power point presentations, visual teaching using molecular models and science experiments to entertain and teach the students basic scientific concepts. We have accomplished our goal given the treacherous weather during the last spring semester and later part of the fall semester. In class session was about 50-60 mins . In most cases classes were held in the school auditorium to accommodate 120-150 students. In all cases, in each school two students taught each session. Four elementary schools were visited this year and 14 student's teachers taught about 950 students.

### **05.05.33 Application of Silver, Gold, and Platinum complexes in Medicine**

**A.K.Fazlur,Rahman** *Oklahoma School of Science and Mathematics*

**Allen,Chen** *Oklahoma School of Science and Mathematics*

This review summarizes the various usage of silver, gold, and platinum complexes and nanoparticles in medicine including some future perspective. The use of metals in medicine was rare in the ancient world. Recent research showed the versatility of metals in pharmacology and medicine. In medicine, metals are now used as complexes or as nanoparticles. When used as complexes, the compounds attach to various ligands in the body to serve targeted functions. Platinum complexes are used to treat cancer due to its ability to prevent the division of living cells. Silver complexes interrupt the ability of bacteria cells to form bonds which causes the bacteria to fall apart. While silver nanoparticles are relatively inert, gold nanoparticles were found to be effective, especially in the treatment of cancer.

### **05.05.35 Organic Compounds as Glaucoma and Antiulcer Agents :**

**A.K.Fazlur,Rahman** *Oklahoma School of Science and Mathematics*

**Brian,Dick** *Oklahoma School of Science and Mathematics*

Glaucoma is an eye condition that damages the optic nerve. Although initially asymptomatic, glaucoma leads to blindness. Current treatment for glaucoma includes the use of organic compounds such as Timolol, Bimatoprost (lumigan), and travoprost ( Travatan). For Ulcer treatment organic compounds such as Cimetidine(tagamet), Nizatidine(Axid) and Famotidine(Pepcid). During the presentation structural aspect of these compounds and biological function will be discussed.

### **05.05.36 Distribution and Quantity of Iodine in Northwestern Oklahoma Brine Waters**

**Austin,Anderson** *Northwestern State University*

**Cori,Hoffman** *Northwestern State University*

**David,Edlin** *Iofina Resources, Inc*

**Jason,Wickham** *Northwestern State University*

In the late 1970's, it was discovered that the brine waters of northwestern Oklahoma contain significant amounts of Iodine (above 60 ppm). However, the exact amounts and distributions of Iodine throughout this brine water formation 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 medical, agricultural, and technological fields the demand for Iodine is higher than ever. Thus, Iofina has recruited the aid of Northwestern Oklahoma State University to quantify the Iodine concentration and distribution throughout the brine aquifer, as well as, determine the longevity of these iodine concentrations. Currently, this has resulted in the discovery of new sites within the aquifer that contain concentrations above 300 ppm and show that the iodine levels are currently steady within about a 5 ppm fluctuation.

### **05.05.37 Changing the Way We Teach Undergraduate Organic Labs Using Microwave Synthesis.**

**Alexander,Rivas** *Cameron University*

**Elizabeth,Nalley** *Cameron University*

**Kristen,Worthen** *Cameron University*

**Taiwo,Adelusi** *Cameron University*

**Taj,Ahmad** *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.

### **05.05.38 Organic Dyes Improving the Efficiency of Dye-Sensitized Solar Cells**

**Ciera,Kelley** *Cameron University*

**Elizabeth,Nalley** *Cameron University*

**Jessica,Gesell** *Cameron University*

**Kristen,Worthen** *Cameron University*

**Miwa,Fukuda** *University of Oklahoma*

In this research dye-sensitized solar cells were constructed using an organic dyes with titanium dioxide nanocrystals. Different formulations of Titanium Dioxide with different sized particles were used and the properties and performance of the solar cells were compared. 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 plate. Different dyes both commercially available and synthesized in our laboratory were tested to determine which dye produced the highest voltage were tested. 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.

### **05.05.39 Computational Studies of Transition Metal Hydroxides**

**Cerina,Stiles** *East Central University*

**Dwight,Myers** *East Central University*

**Laura,Asaro** *East Central University*

Modern superalloys used in the construction of turbomachinery contain a wide variety of metals in trace quantities. Formation of volatile metal hydroxides at elevated temperatures is an important mechanism for corrosion of metal alloys or oxides in combustion environments (N. Jacobson, D. Myers, E. Opila, and E. Copland, *J. Phys. Chem. Solids* 66, 471-478, 2005). Theoretical calculations of reaction energies are an important check on experimental results. However, computational methods involving transition metals are more challenging than for lighter elements. The focus of this project is to examine the effects of different basis sets on energies for the hydroxides of scandium, cobalt, and manganese. Initial results will be presented.

### **05.05.40 (Unnamed)**

**Lindsay,Davis** *Langston University*

The purpose of this project is to increase the efficiency of the Fischer-Tropsch process by targeting the most effective catalyst for the reaction. In previous work, different compositions of nanoparticle metal oxides (Co, Fe, and Cu) co-entrapped sol-gels were synthesized, reduced, and ran catalytic reaction. The products were analyzed using a gas chromatography system (GC). The samples were analyzed after synthesis, reduction, and catalytic reaction using a Vibrating Sample Magnetometer (VSM) for their magnetic properties and the Differential Thermal Analysis (DTA) and Thermal Gravimetric Analysis (TGA) for their thermal properties. Our goal was to analyze the samples after each process to determine a trend in our result that could possibly lead to a reasonable conclusion. The main objective of this project is to study the order of ferromagnetism for each of the samples. By analyzing the saturation magnetization of these samples, we will be able to provide estimations on metal loading, reduction efficiency, and poisoning of the catalyst.

### **05.05.41 Development of glucose amperometric biosensor based on self-assembling glucose oxidase on polydiallyldimethylammonium and multi-walled carbon nanotubes**

**Baljit,Sandhar** *Northeastern State University*

**Jude,Abia** *Northeastern State University*

In this study, a glucose biosensor was developed using layer-by-layer self-assembly method in which glucose oxidase enzyme along with multi-walled carbon nanotubes were sandwiched by electrostatic attraction between two layers of polydiallyldimethylammonium chloride (PDDA) on a platinum electrode. Results show that the conductivity of the sensor was improved with the addition of the nanotubes. The functionality of the biosensor was tested in a three electrode system in a 0.1M phosphate buffer solution containing glucose. At an optimized applied voltage of 0.6V versus Ag/AgCl reference electrode, hydrogen peroxide generated from the enzymatic oxidation of glucose was detected and the resulting amperometric signal used to quantify glucose. The sensor showed a good linear range of 0.08 – 15mM, and a detection limit of 3.5  $\mu$ M. The biosensor also retained 90% of its initial activity of a few weeks of use.

## **05.05.42 Siderophore Production by Marine Fungi**

**Jessica, Martin** *Northeastern State University*

Iron limitation is a major factor influencing the growth of microorganisms, from infection of a mammalian host (where iron is tightly controlled by protein complexation) to aquatic and marine environments (where iron is not soluble or is complexed by organic ligands). Many microorganisms produce low-molecular-weight, iron(III)-specific chelators called siderophores to compete for iron. The objectives of this project are to identify novel siderophores produced by marine fungi and to evaluate them for uses as antimicrobial or antineoplastic agents. Reported here are siderophores produced by marine fungi, antineoplastic activity of these compounds, and the effects of biological competition on siderophore production are being investigated.



## **Abstracts from the 2015 Oklahoma Research Day**

**Held at Northeastern State University**

### **05. Mathematics and Science**

### **06. Computer Science**

#### **05.06.01 Inventory Database**

**Patrick, Harrington** *Northeastern State University*

**Salim, Hassan** *Northeastern State University*

In order for a business to survive and grow, they have to be able to record and maintain their stock and inventory. Not being able to do so would result in poor customer service and ultimately, the failing of the business. The best and most efficient way to manage inventory and stock, especially as the business grows, is through a database. The purpose of this project is to provide a means of storing and managing the inventory and stock a business would need and use. The database would also need to be able to grow in order to accommodate the growth of the business.

#### **05.06.02 Management Software for Preschools & Childcare Facilities**

**Bobby, Goines** *Northeastern State University*

**Patrick, Harrington** *Northeastern State University*

Preschool and childcare facilities are required to maintain safe practices within their buildings based on standards established by the Oklahoma Department of Human Services (OKDHS). The use of software can help reduce the amount of paperwork involved to insure these safety standards. At the time of this project, there was no software designed to coordinate childcare providers and OKDHS in order to manage the requirements. The purpose of this project is to provide a means of storing the information required by OKDHS from childcare facilities in a database and create the necessary reports based on the stored information.

### **05.06.03 The State and Visitor Design Patterns in a Java Game Application**

**Debra,Hogue** *University of Central Oklahoma*

This project takes an existing Java game application from the Spring 2014 Object Oriented Programming class and refactors it with the State and Visitor behavioral design patterns. The game, Go Corgi Go, is a one player, 2D game where the goal is to collect as many squirrels and dog biscuits while avoiding the constantly moving acorns which cause damage to the player's sprite, a corgi. The objective of refactoring is to practice using these two design patterns with the goal of understanding the how and when to use them. The State pattern encapsulates an object's routines based upon its state. Using the State pattern for the spawning, movement, damage, healing and death of the player and squirrel sprites improved the playability of the game. This was due to the polymorphic abilities that take place from using the State pattern. The Visitor pattern abstracts the functionality. This pattern was used for the player's Life count, the overall score, and kept track of the number of squirrels, acorns and biscuits on the screen. The advantage to using this pattern is when performing the check collisions operation, it is performed using a visit class without having to change the source. Utilizing both design patterns cleans up the readability, allows for easy modification and efficient troubleshooting. Both design patterns allow the addition of new functions without changing the classes themselves. This eliminates the occurrence of buggy code due to the classes being

### **05.06.04 Kingdom Saga**

**Debra,Hogue** *University of Central Oklahoma*

**Shira,Zachery** *University of Central Oklahoma*

The popularity of mobile gaming has increased in the recent years due to the advancement of mobile device technology. Therefore it felt necessary to follow suit by developing a game for mobile devices. Kingdom Saga was developed for the Android operating system using Eclipse with the Android Software Developing Kit. This game ties the interactive story of an RPG, role-playing game, game application with four mini-games: Tic-Tac-Toe, Blackjack, Memory, and Galaga. Each of these four mini-games offer an unlockable "design pattern" which will aid the player with defeating the final boss in the RPG part of the game. This project demonstrates the creation of an Android game application with the use of the Java programming language.

### **05.06.05 (Unnamed)**

**Laura,Asaro** *East Central University*

In order to place advertisements relevant to the content of the web pages on which they appear, a text classification process must be executed. This process is burdened by the fact that a person has to observe a web page and manually label it to create training data for the machine. Because there are millions of pages companies want to place ads on, categorizing those pages is both time consuming and expensive, especially when it needs to be done over tens of languages. This task could be made more efficient using machine translation (MT). Our team approaches this problem by automating the process of text classification for foreign-language articles by using machine-translated texts to train a classifier. We experiment with English, Spanish, German, and French articles under several of the Wikipedia Main Topic Classification categories. Training samples for foreign-language articles are built by translating Wikipedia articles from the chosen categories in English to the target languages (Spanish, German, and French) via the Google Translate API. Using Wikipedia's pre-existing classification, a binary classifier is built. In a similar fashion, we also built a binary classifier using native written target language articles. We then examine the effectiveness of MT training versus native language training and investigate the benefits and limitations of our MT model.

### **05.06.06 (Unnamed)**

**Akinola,Akinlawon** *Cameron University*

**Ioannis,Argyros** *Cameron University*

We introduce a special class of real recurrent polynomials  $f_n$  ( $n \geq 1$ ) of degree  $n$  with real coefficients. Then, as the first application, we find sufficient conditions under which each polynomial  $f_n$  has a unique positive root  $s_n$  such that  $s_{n+1} \leq s_n$  ( $n \geq 1$ ). The first root  $s_1$ , as well as the last one denoted by  $s_n$  belonging in  $(s^\infty, s_1]$  ( $n \geq 1$ ). In the second application, we use this technique on Newton's method and show that the famous Newton-Kantorovich condition for solving equations can always be replaced by a weaker one.

### **05.06.07 Preventing Pressure Ulcers by Using Accelerometer, Voice-to-Text, Speech Recognition and Cloud Data Technology**

**Jicheng,Fu** *University of Central Oklahoma*

**Steven,Chambers** *University of Central Oklahoma*

Pressure ulcers impose a serious threat to power wheelchair users. In order to prevent pressure ulcers, one must ensure to adjust his/her position in the wheelchair regularly. Remembering to do so can be difficult, but smartphones can provide a tremendous advantage in reminding a power wheelchair user of making these scheduled adjustments. In addition, the majority of the wheelchairs do not provide the mechanism to measure wheelchair tilt or recline angles. By using the smartphones accelerometer and voice to text technology, the users' tilt and recline angles are monitored in order to provide the user with real-time guidance to keep with a specific tilt and recline angle adjustment schedule. Accessibility in such an application is of utmost importance. In order to provide maximum ease of use, speech recognition technology is employed in order to allow the handicapped user to interact with the application primarily with voice commands. The application also takes the advantage of mobile data networks (either cellular or WIFI) to transmit the tilt and recline angle data to the cloud for storage and subsequent analysis.

## **05.06.08 Improving Game Systems Design Through the Use of Object Oriented Design Patterns**

**Hong,Sung** *University of Central Oklahoma*

**Joel,Darling** *University of Central Oklahoma*

Developing a video game is a complex undertaking which requires tens of thousands of lines of code, with each block requiring extensive unit testing and at times refactoring in order to create a sufficiently complex game. The use of design patterns can simplify this process, giving developers a system by which they can compartmentalize and map-out this process. Four design patterns are used in facilitating the development of a small 2d video game. These patterns are: 1) State Pattern – For use in the implementation of the player animation and game states. 2) Observer Pattern – For use in detecting game events such as item collection as well as collision. 3) Visitor Pattern – For use in collision detection, updating and rendering objects to the level. 4) Command Pattern – For use in programming the response of user input. To test the implementation of these patterns and their usefulness, A game was refactored which was previously created using three other design patterns to facilitate rapid prototyping. While implementing the above 4 patterns, it was discovered that there are situations where implementing design patterns on what seems to be a similar problem results in adding unnecessary time or space complexity to the program. Two of these examples are covered as well as suggested implementations of both of these examples.

## **05.06.09 BIOINFORMATICS OF AMYLOID PRECURSOR PROTEIN (APP) IN DEMENTIA**

**Kellyn,Pollard** *Langston University*

**Sharon,Lewis** *Langston University*

During my senior thesis, I decided to select a gene that was previously implicated in susceptibility to dementia. I chose to use bioinformatics to investigate and visualize the Amyloid Precursor Protein, which has the gene symbol of app. Amyloid Precursor Protein (app) mutations are suspected to occur in individuals with dementia. Looking to expand the knowledge of mental and emotional disorders, an investigation of dementia was performed. Dementia is a syndrome that involves a significant loss of cognitive abilities such as attention, memory, language, logical reasoning, and problem-solving with various extensions into other cognitive and chronic diseases (WebMd.com). The objective of this research is to use bioinformatics to investigate and visualize the app gene mutation in dementia and show the correlation and susceptibility of developing dementia with a mutation of this gene.

Bioinformatics began to surface in the mid to late 1970s and 1980s, and is the science of gathering and analyzing intricate biological data such as genetic codes using computers and statistical techniques. Bioinformatics includes multiple disciplines working simultaneously to extract meaningful knowledge from large biological datasets which are generated from high-throughput technologies such as arrays, mass spectrometers, and meta-sequencing techniques (Hodgman, T. C.).

## **05.06.10 Development of a Smartphone App to Collect Maneuvering Data from Pediatric Wheelchairs**

**Jicheng,Fu** *University of Central Oklahoma*

**Melicient,King** *University of Central Oklahoma*

The analysis of wheelchair maneuvering data is a critical problem that requires greater understanding, and calls for innovation to benefit users of pediatric wheelchairs in particular. While adult wheelchair models can be fitted with a variety of data collection devices, pediatric wheelchairs are often too small to accommodate the hardware. This project proposes to develop a mobile/cloud computing platform to collect and analyze movement data from pediatric wheelchairs using cutting-edge machine learning techniques. Data will be collected using an Android application installed on the user's smartphone, eliminating the need to purchase and install dedicated hardware. This application will automatically upload data to the cloud, where it will be stored and processed via the Google App Engine platform. There, advanced machine learning algorithms will be used to draw conclusions about the distance and type of driving maneuvers made by the user, thus reducing the risk of secondary impairments in the development of social, cognitive, and motor skills.

## **05.06.11 A Novel Google Glass Application to Guide Wheelchair Users in Achieving Effective Tilt and Recline Usage to Reduce Risk of Pressure Ulcers**

**Jicheng,Fu** *University of Central Oklahoma*

**Melicient,King** *University of Central Oklahoma*

Individuals with disabilities often benefit from the use of power wheelchairs to improve their mobility and quality of life. However, prolonged sitting associated with wheelchair use has been shown to cause pressure ulcers, which can be painful, expensive to treat, and even fatal. To reduce this risk, clinicians recommend adjusting the wheelchair's tilt (the angle between seat and floor) and recline (the angle between seat and back). Unfortunately, power wheelchairs are rarely equipped with hardware to measure tilt and recline. Users rely on their own proprioception when making these adjustments, and thus they often fail to achieve a dramatic enough adjustment to reduce the risk of developing pressure ulcers. This project proposes to employ the cutting-edge Google Glass technology to address these problems. We are developing an application to guide the wheelchair user in adjusting tilt and recline while providing immediate feedback. The application will use advanced algorithms along with sensors in the Google Glass to precisely measure tilt and recline. Data regarding usage will be collected by Google Glass and transmitted to the cloud for storage and processing via the Google App Engine platform. There, the data will be analyzed using state-of-the-art machine learning techniques to provide a clear picture of tilt and recline usage to users and healthcare providers. This application will provide an immediate benefit to both wheelchair users and the research community.

## **05.06.12 Battling Stickman – An Android Act Game using AndEngine**

**Hong,Sung** *University of Central Oklahoma*

**Wenxi,Zeng** *University of Central Oklahoma*

Game engines that provide reusable components are widely used for rapid game development. In the Android platform, AndEngine is one of the most popular 2D game engines. In this project, an action game is developed using AndEngine. The main characters in this game are stickmen, and the UI of the game uses hand-painted style. Similar to most action games, the player can manipulate a controllable character to fight with enemies by using keyboard. AndEngine provides easy collision detection when attacking happens between the player and other game figures. In order to enhance combat experiences, two attacking methods are designed, a normal hit and a continuous hit. The normal hit happens each time when the attack button is pressed and released within a short duration. However, when the attack button is kept pressing without interrupt, the continuous hit is triggered. The player's weapon and moves change over time, and the score increases exponentially during the continuous hit period. In summary, using AndEngine's powerful physical engine and rendering mechanism, an action game with some complexity can be rapidly implemented and this project demonstrates it.

## **05.06.13 Using Gaming Technologies to Develop a Research and Training Simulation System for Young Children with Severe Motor Impairments**

**Cole,Garien** *University of Central Oklahoma*

**Jicheng,Fu** *University of Central Oklahoma*

Young children with severe motor impairments face a higher risk of secondary impairments in the development of social, cognitive, and motor skills owing to their lack of independent mobility. Electric wheelchairs are a great tool to provide independent mobility and reduce the risk of secondary impairments for these children. However, the steep learning curve, safety concerns, and high cost may prevent young children from using pediatric wheelchairs at an early age. In this research, we are using gaming technologies to develop a 3D wheelchair simulation system, which allows children aged at 2 to 5 years to hone the key skills required to safely control a joystick-operated wheelchair. The use of gaming technologies allows us to mimic the physics of real wheelchairs so that the collected data will be useful and relevant. The simulation system has three modes of operation; manual, automatic, and shared modes. The automatic and shared modes utilize cutting-edge artificial intelligence techniques to assist the children with smooth and safe maneuvering. In the meantime, we also gather statistics about how the user moves through the environment to help us monitor a child's progress and show areas where the child needs improvement. In summary, our research system will overcome the limitations that are associated with real electric wheelchairs by providing a safe, affordable, and fun gaming environment to train young children and test various artificial intelligence algorithms.

## **05.06.14 Student Academic Advisement Appointment System**

**Faez,Chishti** *University of Central Oklahoma*

This system allows students to sign up online for faculty advisement through a registration process. Students are required to create an account and an academic profile in order to proceed towards appointment sign up. The registration process consists of collecting students' information about their majors, the courses that they took in the past semesters and the courses they plan to take in the upcoming semester along with the grades that they achieved in the past courses. Once registered, student can see and edit their information in the profile section of the web site. They can also view the available time slots for appointment of the advisor and can sign up for one. The administrative area of the application allows faculty member to review the information of the students that have signed up for an appointment and can also add, edit or delete student profiles and their available time slots. This system is implemented using ASP.NET MVC 5 with MySql database. Drag and drop technology is immensely used to provide a rich user interface by utilizing the new advancements of HTML 5. This system ultimately provides an easy and fast way for academic advisors and students to communicate with each other and set appointments without having to visit a physical office.

## **05.06.15 An Experimental Study for Evaluating the Accuracy of a Smartphone App**

**Jicheng,Fu** *University of Central Oklahoma*

**Yuxuan,Wang** *University of Central Oklahoma*

We have developed a smartphone app for measuring wheelchair tilt and recline angles. In this study, we attempt to compare the measurement precision of the smartphone app against a commercial angle gauge (Wixey, WR300). The smartphone and the angle gauge were placed side by side on the armrest of the wheelchair. The tilt angle of the wheelchair was adjusted by 5 degrees a time from 0 degree to 45 degrees. We repeated the experiment for 11 times to ensure the fairness of the comparison. Experimental results show that angle differences only occurred in the range of 30 to 45 degrees. The difference is no more than 1 degree on average. We also analyzed the experimental data with SPSS, which showed the difference of measurement results between the smartphone and angle gauge was not significant ( $p > 0.05$ ) Therefore, we can conclude that our smartphone app offers high measurement precision that is comparable to the commercial angle gauge.

## **05.06.16 (Unnamed)**

**Gang,Qian** *University of Central Oklahoma*

**Stan,Gravchikov** *University of Central Oklahoma*

This presentation introduces our implementation of a user authentication subsystem in an Android mobile application. The user authentication subsystem was used to identify the user of an Android app when it communicates with the Web and database servers. We cover the use of data encryption/decryption along with signature verification for Android app development. We also discuss Android storage mechanisms that support data storage and security.

## **05.06.17 VEHICLE TRACKING VIA MOBILE APPS**

**Amy,Apon** *Clemson University*

**Chris,Gropp** *Clemson University*

**Lycinda,Freeman** *Clemson University*

**Mary,Phillips** *Southwestern Oklahoma State University*

**Mei,Liang** *Clemson University*

The Department of Transportation wants to establish an “Intelligent Transportation System” (ITS), where the vehicles and the road itself know where all vehicles are. The ITS has many advantages for both safety and convenience including reports of traffic accidents as well as road repairs. Data collection will be accomplished using an application programmed to collect GPS data in a fun manner for the user. It is the task of the researchers to create this application.

## **05.06.18 A New KNN Distance Metric for the Classification of Power Wheelchair Maneuvering Data**

**Jicheng,Fu** *University of Central Oklahoma*

**Tao,Liu** *University of Central Oklahoma*

Smartphones are convenient and easy to use for monitoring wheelchair user's daily activities and collecting the maneuvering data, which can quantify their physical activities and motivate to improve the quality of life. In our previous study, the k-nearest-neighbor (KNN) algorithm was applied to analyze data, which often yields competitive classification results despite its simplicity. However, due to the variety in design, different smart phones may generate different readings even for the same driving trajectory, and the unpredictable background noise may also impact the accuracy, hence, KNN with traditional Euclidean distance metric is not able to yield satisfying classification accuracy. To overcome these challenges, we focus on the acceleration and calculate on each 10-element data section to present a 7-tuple set as a vector for KNN distance metric which takes into account: the number of positive values, the accumulated positive value, the number of positive values greater than a threshold, the number of zero values, the number of negative values, the accumulated negative value and the number of negative values less than a threshold. Then KNN is applied on this new distance metric, i.e., the 7-tuple vector. The experiment results showed that significantly higher accuracy in the classification of wheelchair maneuvers (i.e., stationery and moving) was achieved by employing this new distance metric than by using the original approach.



## **05.06.19 A Complementary Training Method for Young Children with Severe Motor Impairments with LEGO Robots**

**Cole,Garien** *University of Central Oklahoma*

**Jicheng,Fu** *University of Central Oklahoma*

**Wenxi,Zeng** *University of Central Oklahoma*

Wheelchair simulation systems have been used for children with severe motor impairments to avoid the high price and steep learning curve associated with pediatric wheelchairs. However, the limited cognitive ability may prevent young children from using such simulation systems effectively. Thus, we propose to use a wirelessly controlled LEGO robot to complement existing simulation systems. The use of LEGO robots is not only safe and affordable, but it also allows us to easily create appropriate training environments, such as strictly forward movement, navigating in narrow corridors, locating objects, etc. By applying advanced control mechanisms, the robot is able to return to its starting location when a mission completes, as well as to stop in front of a detected obstacle. The manipulation of the robot is monitored by a scoring system. In other words, children have to practice repeatedly in one stage until they achieve the stage's preset goal. Moreover, a with-infrared-beacon-robot will be built as a tour guide to interact with the child and his/her robot. In summary, the LEGO robots will enrich existing training approaches by providing an affordable and entertaining way to enhance young children's wheelchair maneuvering skills.

## **05.06.20 Studying the Impact of Smartphone Sensor Sampling Rates on Battery Power Consumption**

**Chuanwei,Chen** *University of Central Oklahoma*

**Jicheng,Fu** *University of Central Oklahoma*

**Wenxi,Zeng** *University of Central Oklahoma*

Smartphones with built-in sensors have been widely used to collect data in biomedical research. As the use of sensors consumes significant power, the battery life has become a major barrier to use it in a practical manner. Sampling rates, as a primary configurable parameter, are directly related to the smartphone sensors. The goal of this study is to investigate the impact of the sampling rate on battery power consumption. In order to accomplish our purpose, an application has been developed and deployed in a Google Nexus 5 smartphone. All of the four predefined sensor sampling modes were tested in our experiments. To ensure the fairness of comparisons among different sampling modes, the smartphone was fully charged before the experiments. Every trial lasted for 120 minutes. The battery percentage and voltage were recorded into a file every 10 minutes. Experimental results show that the mode with higher sampling rate consumed significantly more battery power. To the best of our knowledge, this is the first study investigating how sensor sampling rate impacts battery power consumption. Our experimental results may generate immediate benefits to other research projects, in which smartphones are used to collect data.

## **05.06.21 Climb the Beanstalk: a simple touch-based mobile game**

**Renan,Kuba** *University of Central Oklahoma*

In this project, a simple touch-based game called Climb the Beanstalk is developed for Android-based mobile devices. The storyline of the game is borrowed from Jack And The Beanstalk fairy tale. The player taps on the screen to climb the beanstalk. The objective of the game is to climb as high as possible by avoiding the beans that appear randomly to block the climb path. At the same time, the objective is to climb up as fast as possible under the given time constraints. This game was developed using object oriented programming paradigm. Classes are defined to represent all the game figures including the player, enemies, beans, and other items. Without using sophisticated libraries to build animation and scenarios, this project provides players with fun interactions and live colors in graphics.

## **05.06.22 Malware in the Retail Industry**

**Steven,Anderson** *University of Tulsa*

In recent years there have been multiple large-scale data breaches that involved the leaking of credit card and other personal information. The majority of these data breaches were caused by malware infecting Point of Sale (POS) machines. After the malware infects a POS machine, it attempts to spread to other POS machines on the network. It then continually scrapes the computers RAM (memory), looking for credit card information. When a credit card is swiped, the data is stored in the RAM, found by the malware, and submitted by the malware to a command & control (C&C) server. Once there, the person responsible for the malware gains access to it. This poster uses the Home Depot data breach to represent research performed into BlackPOS, its technical aspects, and the prevention of its use.

## **05.06.23 An Introduction to STIX with Examples**

**Ryan,McCarthy** *University of Tulsa*

Structured Threat Information Expression (STIX) is a standard developed by Mitre that is being backed by the Department of Homeland Security (DHS). STIX aims to standardize the way companies and governments share indicators of compromise so we can better protect computers across the world. STIX attempts to achieve this goal by defining a standardized language to represent cyber threat information. Standardizing the threat indicators allows for computers to become much more automated in how they handle and use these indicators. Computers can work with data much more efficiently than humans can and this allows them to ingest and act on information much quicker than humans ever could. This makes it possible to share and use indicators around the world in near real-time. The advantages and attributes of STIX will be demonstrated while analyzing a sample of malware to see how STIX conveys an in-depth knowledge of attacks and targets.

## **05.06.24 A 256-bit AVX2-based C/C++ Library for the Smith-Waterman Algorithm**

**FNU "Ray",Renaldi** *University of Central Oklahoma*

**Gang,Qian** *University of Central Oklahoma*

The Smith-Waterman algorithm (SWA) is the standard approach to producing the optimal local alignment between two biological sequences. The striped Smith-Waterman algorithm is an effective algorithm that improves the efficiency of SWA by properly utilizing the parallel SIMD commands provided by modern processors. This presentation introduces a 256-bit Intel avx2-based library that implements the striped SWA. Our implementation is derived from an existing C/C++ library developed by Mengyao Zhao, et al. While the original library is based on Intel's 128-bit SSE SIMD instructions, we use the newer 256-bit avx2 instruction set. Our experimental results show that our implementation achieved an average increase of 25% in the alignment speed over the original library. We have also analyzed the bottleneck of the striped SWA, which prevents us from achieving a 100% performance improvement.

## **05.06.25 Mobile Work Orders**

**Colten,Boston** *Northeastern State University*

**Rad,Alrifai** *Northeastern State University*

Most work places use Work Orders to record, track and prioritize service requests. This mobile application allows for very simple, but powerful, tracking of work orders found in many business environments where employees can use their android smartphone for this purpose. This application was developed using the Android SDK within the Eclipse IDE to program the app in Java and XML.

## **05.06.26 Mathis Electronic Store**

**Rad,Alrifai** *Northeastern State University*

**Tyler,Mathis** *Northeastern State University*

This website lets customers check a store's inventory online to see if it sells the item(s) they're looking for. The store hosts a database that holds a list of its inventory, registered users, and orders to be processed. The store can add and remove inventory as they see fit, as well as, edit the details of an item and list if it is available. The customer can access the site, add any items they want to their cart, and purchase them online. When the customer pays for their items, an order form is created listing the bought items. This project was developed in C#, HTML and SQL Server 2012.

## **05.06.27 Auction Clerking System**

**Justin,Crozier** *Northeastern State University*

**Rad,Alrifai** *Northeastern State University*

This project aims to recreate the clerking system for auction houses by using a modern programming language and modern graphical user interface. The auction clerking system is used to manage information needed to run an auction. It tracks information about buyers, sellers, and items being sold. The application performs all necessary calculations and generates receipts for buyers and sellers. This application was developed in C# programming language and Microsoft Access 2013 for database storage.

## **05.06.28 Auto Attendance App for Android**

**Matthew,Stewart** *Northeastern State University*

**Rad,Alrifai** *Northeastern State University*

Many instructors like to monitor classroom attendance, and many students come to the classroom carrying with them mobile phones or tablets. This app allows students to record their attendance. Thus, it provides an easy solution for instructors to track attendance while preserving class time from being wasted on roll calling. Instructors can login to the system to manage classes and students information to view and report on attendance history. This project is developed in Eclipse IDE with the android ADT plug-in and android 4.2 SDK. It was coded in java, XML, and SQLite.

## **05.06.29 Critter Emporium: An online pet store**

**Jackie,Searcy** *Northeastern State University*

**Rad,Alrifai** *Northeastern State University*

Critter Emporium is an online pet store with responsive user-friendly interface that allows a user to browse pet products. This project provided an introduction to designing a website. It serves as an overall model of the general construction of websites. The application uses HTML5 and CSS to create a user-friendly interface that is visually appealing. C# sets up and allows for LINQ to query the database.

### **05.06.30 Shellcode for Buffer Overflow Attacks**

**Cole, Penning** *University of Central Oklahoma*

A shellcode is a short segment of code that is used as a payload for software exploitation. Programs written in C++ or C languages are specifically vulnerable if they do not automatically check boundaries when information is inserted into buffers, or arrays. This is a critical problem because inserting more information than expected can overwrite other parts of the memory. For instance, using shellcode as a payload of buffer overflow exploits, an attacker overwrites the return address of a currently active function so that the shellcode is executed to spawn a root shell rather than the program's intended execution path. This work presents what hackers should consider to create a shellcode that exploits a buffer overflow vulnerability in a C or C++ program. To be specific, my research includes bypassing security measures such as ASLR and Canaries, creating position-independent and Null-free code, and encoding shellcode to go undetected. I will demonstrate buffer overflow attacks, shellcode writing techniques, and ways attackers can thwart system security measures. My future research plan is to study how shellcode is used in writing viruses and malware.

### **05.06.31 Gamifying Discreet Math With Programming**

**Douglas, Schlumbohm** *Cameron University*

**Han, Xiong** *Cameron University*

Gaming environments have been used to teach mathematical topics such as addition and division in a fun manner. This is called "gamification" However, when it comes to college level mathematical concepts such as the use of the quadratic formula, there are very few software that explain these concepts in a fun, or gamified way. We are currently developing a video game using the Unity 4 developing environment to teach the subject of sets from the study of discreet math in a fun way thus gamifying the subject. We are taking 3d models, 2d sprites, and animations that our multimedia teammates have created and are breathing life into them using the c# programming language. We are using these c# scripts to move these models, perform calculations, and display the results of players' interactions with the game. Through playing this game that is powered by c# coding, players will actually have fun while learning the concepts of the intersection and union of sets.

### **05.06.32 Gaining HTC Resources in an Indifferent Environment**

**Alanna,Riederer** *University of Central Oklahoma*

**Bradley,Paynter** *University of Central Oklahoma*

**Cory,Beadle** *University of Central Oklahoma*

**Jake,Burdine** *University of Central Oklahoma*

**Jordan,Michela** *University of Central Oklahoma*

**Robert,Smith** *University of Central Oklahoma*

There are many researchers across the country working at primarily teaching universities. These researchers usually have limited access to high-performance computing (HPC) resources. In these cases, high-throughput computing (HTC) solutions such as HTCCondor are attractive as they require significantly less infrastructure cost. Unfortunately, implementation of this resource can meet major resistance from university IT departments worried about the cluster increasing their workload, and from users worried about the impact on their ability to use their desktop computers. In this poster we present a solution using virtual machines that shows promise in providing HTC resources in a way that minimizes IT maintenance needs and user impact.

### **05.06.33 Mobile Device Analysis Corpus**

**Mike,Morrison** *Southwestern Oklahoma State University*

There is an exponential amount of mobile devices released to the public every month. For a Digital Forensic Examiner, it is their profession to be a subject matter expert on these mobile devices and to thoroughly understand how they operate. The researchers goal was to assemble and analyze a digital forensic library consisting of approximately 50,000 mobile devices.

### **05.06.34 Web-based Database Inventory Project: for the Information Technology Department of A Local Hospital in Lawton, OK.**

**Demilade,Adenuga** *Cameron University*

### **05.06.35 Country Comparisons of Proven Energy Reserve Utilization**

**Myung Ah,Park** *University of Central Oklahoma*

Service learning in higher education aims at educating students as a life-long responsible citizen. It has been shown in the literature that service learning can make positive impacts on students in various ways. However, there is a little work that has been done in security education to provide a service learning experience for students. In the last two years, the author has attempted to incorporate a service learning component into security education through course assignments and research experiences for undergraduates. Specifically, the research experiences were intended to address gender inequity issue in information security field. The beneficiary of the services has been the Office of Information Technology of the university the author is affiliated with. The details of how this work has been conducted will be presented.

## **Abstracts from the 2015 Oklahoma Research Day**

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

#### **05. Mathematics and Science**

#### **07. Criminal Justice**

##### **05.07.01 A Descriptive Analysis of Homicides from 1972 to 2013 in the City of Lawton, Oklahoma**

**Jonathan,Odo** *Cameron University*

**Moonki,Hong** *Cameron University*

The objective of this research project is to describe patterns and temporal trends of homicides in Lawton from 1972 to 2012 by using the Supplementary Homicide Reports (SHR) of the FBI Uniform Crime Reporting Data for Oklahoma. To accomplish this objective, we will conduct a descriptive analysis aimed at answering four questions: (1) What is the most common month for homicides occurred in Lawton, Oklahoma? (2) Who are the victims and offenders of homicides in Lawton? (3) What is the relationship between the victims and offenders of homicides? and (4) What are weapons used most in homicides in Lawton? Although this research project is very preliminary, the finding will advance our understanding of homicides in Lawton. And, local police department and policymakers may use this finding to develop their own public safety strategies. The finding is useful for Lawton residents who want to make the city a safer place to live in. Also, the finding is an important cornerstone for the future study, which identifies economic, social, other factors affecting homicide in Lawton.

##### **05.07.02 Voting Rights of the Convicted**

**Richard,Williams** *Northeastern State University*

Is felony disenfranchisement counter-productive to offender reentry? States have the ability to control the election polls by not allowing ex-offenders to vote. Only two states currently allow offenders to vote while in custody. The remaining states only allow offenders to vote at particular times within corrections (e.g. probation and parole), if allowed to vote at all. This research will gather current case law discussing the 8th and 14th Amendments and the Civil Rights Act of 1965 to discover the history of offender voting rights and how this impacts the offender's reentry.



### **05.07.03 Prosecutorial Misconduct & the Disclosure of Evidence**

**Stephanie, Girdner** *Northeastern State University*

Stephanie C. Girdner Northeastern State University 2 February 2015 Prosecutorial Misconduct & the Disclosure of Evidence Abstract This research will examine the constitutional obligation of prosecutors to disclose certain types of evidence, specifically exculpatory evidence and impeachment evidence, in discovery proceedings or upon request by defendants during criminal proceedings. Some defense attorneys contend that some prosecutors violate defendants' due process rights guaranteed by the Fifth and Fourteenth Amendments of the U.S. Constitution by withholding evidence that would impact or change the outcomes of criminal cases. By analyzing and outlining the court cases surrounding prosecutors' obligatory disclosure of evidence, this research will show how the U.S. Supreme Court interpreted and clarified the Brady rule that was established in *Brady v. Maryland*, 373 U.S. 83 (1963), and other rulings of subsequent cases. Furthermore, this research will attempt to determine if or when prosecutors can be held criminally responsible or liable for their prosecutorial misconduct of the nondisclosure of exculpatory or impeachment evidence to defendants during criminal proceedings.

### **05.07.04 The USA Patriot Act and Its Impact on Americans' Expectations of Privacy and the Fourth Amendment to the U.S. Constitution**

**Christine, Crockett** *Northeastern State University*

9/11 is a date that forever changed American history, and drastically impacted how the U.S. protects its citizens against terrorism. The USA Patriot Act had tremendous support in wake of 9/11, but years later its constitutionality is being called into question. This research will focus on how the Patriot Act conflicts with the Fourth Amendment protections against unreasonable searches and seizures. It will take a look at the definition of terrorism and how events such as 9/11 impact legislation along with the legislative history of a citizen's expectations of privacy. It will examine U.S. Supreme Court cases that look at how federal organizations investigate terrorism in the U.S. before and after 9/11. The question is how much governmental intrusion is socially accepted by Americans for the greater good of protecting and defending the U.S. against the threat of terrorism.

## Abstracts from the 2015 Oklahoma Research Day

### Held at Northeastern State University

#### 05. Mathematics and Science

#### 08. Engineering

##### 05.08.01 The enhancement of laser immunotherapy by low-dose cyclophosphamide

**Aamr,Hasanjee** *University of Central Oklahoma*

**Cody,Bahavar** *University of Central Oklahoma*

**Elivia,Layton** *University of Central Oklahoma*

**Connor,West** *University of Central Oklahoma*

**Elivia,Layton** *University of Central Oklahoma*

**Sheyla,Rabei** *University of Central Oklahoma*

**Wei,Chen** *University of Central Oklahoma*

Metastatic cancer is the number one cause of cancer death. There has been minimal advancement in developing effective treatment options. Laser immunotherapy (LIT) is an innovative cancer treatment modality that uses laser irradiation and immunological stimulation to treat late-stage, metastatic cancers. LIT is currently being performed by interstitial laser irradiation. Although LIT is still in development, recent clinical trials have shown that it can be used to successfully treat patients with late-stage breast cancer and melanoma. The goal of this study was to observe the immunological effects of cyclophosphamide (CY) in combination with LIT on the survival rate of tumor-bearing rats and mice. CY is a chemotherapeutic agent that has shown limited success in treating patients with metastatic cancer. However, when used in low doses it can suppress regulatory T cells (Tregs) and enhance the immunological response created by LIT. Studies have shown that low-dose CY enhances apoptosis and decreases homeostatic proliferation of TRegs. In this preliminary study, tumor-bearing rats were treated with LIT using an 805-nm infrared laser at a power of 2.0 W and low-dose CY. The same parameters were used to perform a similar experiment using tumor-bearing mice. Spleen cells from the treated mice were then harvested and used to study the immunological response of LIT with low-dose CY. Glycated chitosan was used as an immunological stimulant. Our results confirm that low-dose CY can be u

## **05.08.02 Induction of Anti-tumor Immune Response by Noninvasive Laser Irradiation and Immunologically Modified Carbon Nanotubes using Mammary Tumor Model in Rats**

**Aamr,Hasanjee** *University of Central Oklahoma*

**Austin,Doughty** *University of Central Oklahoma*

**Cody,Bahavar** *University of Central Oklahoma*

**Connor,West** *University of Central Oklahoma*

**Erica,Halterman** *University of Central Oklahoma*

**Feifan,Zhou** *University of Central Oklahoma*

**Wei,Chen** *University of Central Oklahoma*

Laser immunotherapy (LIT) is evolving as a new method for treating metastatic cancer. LIT is capable of reducing primary tumors and launching effective systemic anti-tumor responses. Using a targeted treatment approach along with a novel immunoadjuvant, glycated chitosan (GC), LIT is able to induce an anti-tumor immune response to highly aggressive metastatic cancers. In this study, Noninvasive Laser immunotherapy (NLIT) was selected to be the primary treatment method. Single-walled carbon nanotubes (SWNTs) were used in the treatment regimen to enhance the thermal effect of NLIT on tumors. SWNTs were conjugated to GC to create an immunologically modified carbon nanotube (SWNT-GC). To determine how different laser irradiation durations, 5 minutes or 10 minutes, would affect the treatment outcome, a series of experiments were performed. Rats were injected with DMBA-4 cells, an aggressive, metastatic cancer line. The group of rats that received 10 minutes of noninvasive laser treatment with SWNT-GC (laser+SWNT-GC) had a 50% survival rate, without primary or metastatic tumors. The group treated for 5 minutes with laser+SWNT-GC had no survivors. Thus, we concluded that NLIT treatment using SWNT-GC for 10 minutes is more effective at reducing tumor size and inducing long-term anti-tumor immunity than NLIT-SWNT-GC treatment for 5 minutes. This study provides a means of improvement of NLIT for future studies.

## **05.08.03 Improving the Hydraulic Efficiency of Centrifugal Pumps through Computational Fluid Dynamics Based Design optimization**

**ABDELLAH,MOUSSA** *University of Central Oklahoma*

**Tyler,Grubb** *University of Central Oklahoma*

**Yunhao,Lin** *University of Central Oklahoma*

The design and optimization of turbo machine impellers such as those in pumps and turbines is a highly complicated task due to the complex three-dimensional shape of the impeller blades and surrounding devices. Small differences in geometry can lead to significant changes in the performance of these machines. We report here an efficient numerical technique that automatically optimizes the geometry of these blades for maximum performance. The technique combines, mathematical modeling of the impeller blades using non-uniform rational B-spline (NURBS), Computational fluid dynamics (CFD) with Geometry Parameterizations in turbulent flow simulation and a novel optimization techniques a probability density and multiple restarts.

#### **05.08.04 Aerodynamic Drag Reduction for A Generic Sport Utility Vehicle Using Rear Suction**

**ABDELLAH,MOUSSA** *University of Central Oklahoma*

**Justin,Fischer** *University of Central Oklahoma*

**Rohan,Yadav** *University of Central Oklahoma*

The high demand for new and improved aerodynamic drag reduction devices has led to the invention of flow control mechanisms and continuous suction is a promising strategy that does not have major impact on vehicle geometry. The implementation of this technique on sport utility vehicles (SUV) requires adequate choice of the size and location of the opening as well as the magnitude of the boundary suction velocity. We report here a new methodology to identifying these parameters for maximum reduction in aerodynamic drag. The technique combines automatic modeling of the suction slit, computational fluid dynamics (CFD) and a global search method using orthogonal arrays. It is shown that a properly designed suction mechanism can reduce drag by up to 9%.

#### **05.08.05 Aerodynamic Drag Reduction for a Generic Truck using Bump-Shape Vortex Generators**

**ABDELLAH,MOUSSA** *University of Central Oklahoma*

**Justin,Fischer** *University of Central Oklahoma*

**Rohan,Yadav** *University of Central Oklahoma*

**Rhiannon,Hensley** *University of Central Oklahoma*

The continuous surge in gas prices has raised major concerns about vehicle fuel efficiency, and drag reduction devices offer a promising strategy. In this project we investigate the extent to which bump-shape vortex generators placed in the rear of the cabin roof have on the overall reduction of aerodynamic drag for a generic model of a commercial truck. The incorporation of these devices requires proper choices of the size, location and overall geometry. In the following analysis we identify these factors using a novel methodology. The numerical technique combines automatic modeling of the add-ons, computational fluid dynamics and optimization using orthogonal arrays, a probability density and repetitive restarts. Numerical results showed reduction in aerodynamic drag between 6% and 10%.

## **05.08.06 Transmittal Pulse Oximetry**

**Carlos,Echavarri** *University of Central Oklahoma*

**Chelsea,Spencer** *University of Central Oklahoma*

**Jessica,Webb** *University of Central Oklahoma*

**Yuhao,Jiang** *University of Central Oklahoma*

Pulse Oximeters are widely used in hospitals, clinics, and households all around the world by patients for many different reasons. However, based on our market research, most of these devices are either complicated and heavy or simple and portable with many functions missing. There is a need to offer an alternative design of pulse oximeter which is functional, portable, and marketable. Our senior design goal is to design, build, and test a portable pulse oximeter that captures a patient's blood oxygen saturation levels, and also the patient's pulse rate while remaining compact enough not to cause inconvenience to the patient's everyday activities. Our portable device will be easy to use though fast enough so that the patient will, within seconds, learn their oxygen saturation levels and pulse from the device display. Our group has successfully designed and built a functioning detection circuit, as well as designed and implemented a timing circuit. During this semester we are able to put timing and detection circuit together and build a portable component so that the patient is free to live their lives as comfortable as possible. As both circuits come together and are tested, we will be able to make our product more compact.

## **05.08.07 Design of a test station for measuring the performance of centrifugal pumps**

**ABDELLAH,MOUSSA** *University of Central Oklahoma*

**Hamzah,AIRashdan** *University of Central Oklahoma*

**Hedrine,Nchinda** *University of Central Oklahoma*

**Ira,Topp** *University of Central Oklahoma*

Pumps are mechanical devices that add energy to a fluid as a result of the dynamic interactions between the device and the fluid. The first curved vane centrifugal pump was invented by the British engineer John George Appold in 1851 and since then numerous advances in design and application have been implemented. Today, centrifugal pumps are used in almost any and every sector of industry. Typical pump efficiency range between 60 and 80 %, and small differences in geometrical details can lead to significant changes in the performance of these machines. In this project, we design the experimental setup and instrumentation to automatically produce the pump characteristic and efficiency curves for several test models of centrifugal pumps. The experimental station is equipped with pressure and mass flow rate sensors, valve control regulator and a safety monitoring system that shuts down when critical pressures or flow rates are reached. The station also provides a visual representation of the pump characteristic and efficiency curves, and allows easy install of various impeller, volute, and casing geometries.

### **05.08.08 Determining the Entropy Generation and Flow Characteristics of Developing Flow in Rectangular Channels**

**Aric, Gillispie** *University of Central Oklahoma*

**Evan, Lemley** *University of Central Oklahoma*

Entropy is a thermodynamic quantity that can be thought of as thermal energy that cannot be converted into mechanical work, because of what can be considered as a lack of order. The objective of the current research is to conduct a detailed investigation of the entropy generated in a rectangular channel before the flow has become fully developed. It will serve to better explain how energy is dissipated in laminar flows within rectangular cross sections while the flow is still developing. In order to calculate the entropy generated in the channels, we must perform several experiments and analyses. First, any adjustments to the particle imagery velocimetry, PIV, system will be made to accurately obtain the velocity of the specific fluid used in the experiments. Using the PIV system, a velocity profile will be obtained along various sections to first insure that the flow has not become developed, and second to calculate the velocity of the flow at each section. The volumetric flow rate will also be calculated. Finally, throughout the test region there will be numerous pressure sensors placed to accurately gain the pressure differences between the consecutive test sections. This information is critical in calculating the loss coefficients. Several of these tests will be performed with various fluid viscosities, and Reynolds Numbers so as to generalize the results for any rectangular channel of any size.

### **05.08.09 Near Space Ballooning: Equipment Research and Project Analysis**

**Dallas, Elleman** *Tulsa Community College*

**Thomas, Henderson** *Tulsa Community College*

The scientific or engineering researcher that wishes to measure the effects of deep space on biological or mechanical experiments may not have the opportunity to do so with the limited resources available to learning institutions. If arrangements can be made for the experiment to fly on a rocket then pertinent questions would include: preparation time (time to launch), flight time duration, accommodations for data retrieval, and cost. Rather than use valuable resources to achieve deep space effects on experiments, critical outcomes could be measured at an altitude of 100,000 feet. This research investigates the equipment necessary to conduct experiments with sample payloads at high altitude also referred to as near space ballooning.

### **05.08.10 Micropipette Aspiration Technique: From Textbook to Testing**

**Gang, Xu** *University of Central Oklahoma*

**Nikolas, Wagner** *University of Central Oklahoma*

The goal of this research is to design and construct a micropipette aspiration system around a research microscope that can be used in cellular biophysics research. Based on the fluid mechanics principles, this system can apply small suction pressures across the tip (a few micrometers in diameter) of a micropipette that will be used to manipulate individual cells or apply small pico-Newton forces through a force transducer such as a microsphere inside the micropipette. The detailed principles and design of our custom-made micropipette aspiration system will be discussed, as well as the sample calculations and measurements. This system will be used in our ongoing study on the manipulation of single flagella and testing of their mechanical properties.

### **05.08.11 Forging the small in a hot box**

**Gang,Xu** *University of Central Oklahoma*

**Jordan,Johnson** *University of Central Oklahoma*

This project was to design and assemble a microforge system to process micropipette tips. Micropipettes with 1-10 micron tip diameter are commonly used in cellular and molecular biophysics studies to manipulate single cells or other small objects. The desired micropipette tips require not only precise diameters but also flat smooth openings. Therefore, the rough tips of those micropipettes made by the commercial puller need to be further processed before being used in experiments. In this study, we designed and custom made a microforge system around a basic dissecting microscope. Our design implemented a specialized circuit to control the heating of a small glass bead through a piece of platinum wire. Flow of melted glass into the micropipette tip can be precisely controlled by heating to reach the desired diameter inside of the pipette. After heating was stopped to solidify the glass inside, the pipette would be moved away from the glass bead, during which the micropipette tip would break right at the stopped flow front due to stress concentration. Most of times a nicely flat and smooth tip with desired diameter was obtained. This system allows custom forging of individual pipettes for specific experimental needs.

### **05.08.12 DC Dielectrophoretic Particle-Particle Interactions and Dynamics**

**Matthew,Benton** *University of Central Oklahoma*

**Mohammad,Hossan** *University of Central Oklahoma*

Dielectrophoresis (DEP) has become one of the most popular mechanisms for label free particle manipulations and transport in microfluidics. When particles suspended in a fluid are subjected to an external electric field, the particles polarize and create local non-uniformities in the electric field. Within a close proximity of each other, this induces a dielectrophoretic force upon all of the involved particles. In order to investigate this effect, we use numerical simulation to model the interactions between particles for various configurations. The numerical model utilizes Maxwell's stress tensor to obtain the dielectrophoretic particle-particle interaction forces while solving the transient Navier-Stokes equation to determine the hydrodynamic interaction between each of the particles and the fluid containing them. By varying the number of particles as well as the particles' size, electrical properties and initial orientation, a number of possibilities are considered. Results indicate that particles with similar electrical properties tend to align themselves parallel to the external electric field regardless of sizes. In contrast, particles with differing electrical properties tend to align perpendicular to the electric field irrespective of sizes and orientations. This study explains the effect of size and electrical properties on DEP interactive motions of particles and can be utilized to design microfluidic devices for DEP particle manipulations.

### **05.08.13 Watching Swimming Race of Green Alga Cells: Correlating Motility with Viscosity**

**Gang,Xu** *University of Central Oklahoma*

**Kara,Clark** *University of Central Oklahoma*

**Steven,Karpowicz** *University of Central Oklahoma*

**Thi,Nguyen** *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. In this work, cells were cultured in medium of higher viscosities and their movements were recorded with a high-speed camera on the microscope. A custom MATLAB tracking program was used 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 show 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.

### **05.08.14 Protein concentration and detection in a microdevice for cardiovascular disease diagnosis**

**Jennie,Allen** *University of Central Oklahoma*

**Mohammad,Hossan** *University of Central Oklahoma*

**Regina,Smith** *University of Central Oklahoma*

**Steven,Karpowicz** *University of Central Oklahoma*

**Thiago,Omena** *University of Central Oklahoma*

**Tucker,Teigland** *University of Central Oklahoma*

Cardiovascular disease is the leading cause of death in the world resulting in the loss of 17.1 million lives a year. One in four heart-damaging events goes unrecognized or misdiagnosed due to lack of symptoms. Cardiac troponin I (cTnI) is a protein specific to the heart muscle that is the preferred biomarker for detecting cardiac damage. However, because the concentration of cTnI isoforms (phosphorylated and unphosphorylated) in the blood is so small, there are currently no microdevices to monitor heart disease. Application of an electric field in a buffer solution with samples, known as electrophoresis, can separate and concentrate proteins. Our goal is to design a microdevice that is capable of separating and concentrating cTnI isoforms using electric fields, prior to an immunoassay that will then detect cTnI isoforms. The separation and concentration of proteins was enhanced with a combination of novel microdevice design and on-chip electrophoresis. The detection of phosphorylation-specific cTnI will be accomplished by using antibodies and immobilizing cTnI in the device. We achieved an increased sensitivity to a phosphorylation specific cTnI while also decreasing the limit of detection through antibodies with immobilized cTnI. These results allow us to differentiate and quantify different phosphorylation states of cTnI. In summary, our microdevice has great potential as a point-of-care tool in the accurate diagnosis of cardiovascular disease, possibly saving many lives.



## **05.08.15 Direction-Biased Acoustic Metamaterial Waveguide**

**Barrett, Lee** *Oklahoma State University*

**James, Manimala** *Oklahoma State University*

**Prateek, Kulkarni** *Oklahoma State University*

**Vishnu, Paidimarri** *Oklahoma State University*

Acoustic Metamaterials (AM) are a class of artificial materials that derive their unique dynamic properties not just from material constituents but more so from engineered configurations. Tailoring their engineered configurations imparts unusual wave manipulation capabilities that bring about novel applications. We demonstrate the feasibility of a passive direction-biased structural waveguide using an AM having sequential arrays of linear and nonlinear hardening-type (NLH) resonators. Simulations show that by choosing the local resonance frequencies of the linear and NLH resonators appropriately, an amplitude-activated direction-bias in the propagation characteristics is achieved depending on whether the incident wave first passes through the linear or NLH resonator arrays. A prototype will be experimentally evaluated to verify the mechanism of shift in the spectrum of the propagated wave to lower frequencies when it passes through the NLH resonator array and the stop-band of the linear resonator array that enables this AM to act as waveguide in one direction and filter in the opposite direction for excitation within a tunable frequency range. An entirely passive direction-biased waveguide for mechanical waves would be a promising step towards a full-fledged mechanical analog of the electronic diode. It has attractive applications for acoustic shielding of sensitive equipment and steering and focusing of mechanical waves in both medical and military devices.

## **05.08.16 Developing an image processor to extract lipid size information from hepatic steatotic images**

**Mahesh, Banjara** *University of Central Oklahoma*

**Yuhao, Jiang** *University of Central Oklahoma*

As the second most common transplantation, liver transplant depends on livers donated from cadaver and living donors. The more lipid content a donor liver has and the bigger the size of lipid vacuole in hepatocyte is, the higher risk of ischemic reperfusion injury the donor liver has after transplantation that risks the patient's life. We propose to use image processing methods to morphologically classify liver tissue of different levels of non-alcoholic steatosis, in terms of the volume concentration and size distribution of lipid vacuole. Specifically, we develop the advanced image processing methods including morphological process and image segmentation to extract the sizing parameters specific to macro-vesicular and micro-vesicular steatosis.

## **05.08.17 PROPOSAL FOR DESIGN AND IMPLEMENTATION OF CAPACITANCE TO DIGITAL CONVERTER**

**ANDRE,OMENA** *University of Central Oklahoma*

**JOHN,SEMANDS** *University of Central Oklahoma*

**MATTHEW,NEIGHBORS** *University of Central Oklahoma*

Capacitive sensors are widely used in industrial, scientific, medical, automotive, and consumer applications including pressure measurement, touch sensing, position sensing, level sensing, humidity sensing, flow meters, and impurity detection. This project focuses on creating a wireless infrastructure for monitoring high resolution capacitive sensors. The objective is to design and configure a wireless sensor transducer (WiST) system to monitor capacitive sensors, convert the measurements to digital signals, and transmit the data to display at a receiving station (Gateway). High resolution capacitive to digital conversion allows more divisions over the sensing range which can support more decision making threshold conditions. Wireless capability decreases clutter of wires and allows for mobility of monitoring. Special consideration is given to hardware connectivity, programming, modification, and refinement into a finished product.

## **05.08.18 A Punch on Collagen Punch: Induced Wound Reveals Tension in Human Dermal Equivalent**

**Cory,Anderson** *University of Central Oklahoma*

**Gang,Xu** *University of Central Oklahoma*

**Lauren,Tinnin** *University of Central Oklahoma*

**Melville,Vaughan** *University of Central Oklahoma*

The objective of this research project is to probe and quantify the mechanical tension generated in an in vitro dermal equivalent model created for studying wound healing. The dermal equivalent is made up of collagen lattices cultured with human fibroblasts. We probe the stress in these dermal equivalents by removing a small piece of tissue from the center of the lattice then observing the expansion of the hole. The faster the hole expands, the more tension is present. We study the effect of transforming growth factor on the tension. Also, we have studied the effects of different concentrations of media as well as different biopsy punch sizes. Understanding the biomechanics of the models will be an important step in understanding wound healing.

## **05.08.19 Evaluate Fiber Coated Hip Implant by Using Fatigue Setup**

**Morshed,Khandaker** *University of Central Oklahoma*

**Zack,Johnson** *University of Central Oklahoma*

When it comes to implants, recovery time and failure can be a significant problem. It is important to know how much stress can be applied to a titanium-cement interface. The main application of this knowledge is for titanium implants, and how the cement will hold when a cyclic load is applied. A cyclic load simulates the action of a person walking or moving in an everyday setting. The goal is to evaluate the interface between a nano-fiber coated titanium implant and the bone cement, using a fatigue setup. The nano-fibers will be applied to the surface of the implant using an electrospinning process. The results are anticipated to show that the fiber coated titanium implant is able to withstand a cyclic load better than a non-coated implant. Static tensile tests were performed. The tensile load that the titanium-cement interface broke; was around  $27 \pm 2.69$  N. This will be used for the pre load for fatigue testing Titanium implants with and without fibers will be tested to determine fatigue life. The results could possibly be applied to increase the strength of hip implants and to shorten the recovery time for implants.

## **05.08.20 An Investigation of Cellular Motility Using Rescued Algal Cells**

**Daniel,Fijalka** *University of Central Oklahoma*

**Gang,Xu** *University of Central Oklahoma*

**Steven,Karpowicz** *University of Central Oklahoma*

**Thi,Nguyen** *University of Central Oklahoma*

The flagella of green alga *Chlamydomonas reinhardtii* are a popular model system utilized to study human cilia due to their remarkably similar genetics, structure, and functions. With an ultimate goal of understanding human cilia-related diseases, the correlation between structure and function in *Chlamydomonas* flagella must be investigated to provide better understanding in this area. The observation of how cells adapt to move in a variety of media can bring new insight. To achieve this, *Chlamydomonas* cells were cultured in various medium viscosities and then diluted with a control media to revert or “rescue” them from their thicker growth media. Videos of the cells were immediately taken after the dilution with a digital camera under a microscope and their velocities were tracked using a custom Matlab imaging processing program. Our data show that *Chlamydomonas* flagella appear to maintain their ability to propel the cell body. Combined with genetics data, this information may shed new light on how mechanics and genetics are regulated for flagellar and ciliary functions.

## **05.08.21 Solar Powered Water From Air Extraction System**

**Mahesh,Banjara** *University of Central Oklahoma*

**Manit,Kaliraj** *University of Central Oklahoma*

**Mustafa,Alhaddad** *University of Central Oklahoma*

**Sagar,Sharma** *University of Central Oklahoma*

The purpose of this project is to design a size system that can extract water from humid air using the principles of mechanical and electrical engineering. Considering the main goal is to extract enough drinking water supply for a small family of 2 to 4 members as efficient as possible. This design is to provide a pure form of drinking water extracted from air using a system running completely on solar power. For this system, it consists of solar panel, charging battery, compression unit and water filtration technique. This system will absorb the humid air from atmosphere and extract water from it. We approached to produce safe standard drinking water specified by "Water Quality Board" of the United States, which is "Safe Drinking Water Act (SDWA)". We are trying to make the design as portable as possible that means it can be fit in the trunk of SUV. We are still working on the project we have not find any conclusions yet but as of now the team is investigating on the application of solar energy to extract water from atmospheric air presented. The study also includes system design characteristics and the climatic conditions.

## **05.08.22 Development of a Novel Tracking Method for Tumor Metastases Using MRI and Molecularly-Targeted Contrast Agents**

**Aamr,Hasanje** *University of Central Oklahoma*

**Austin,Doughty** *University of Central Oklahoma*

**Cody,Bahavar** *University of Central Oklahoma*

**Debra,Saunders** *Oklahoma Medical Research Foundation*

**Nataliya,Smith** *Oklahoma Medical Research Foundation*

**Rheal,Towner** *Oklahoma Medical Research Foundation*

**Wei,Chen** *University of Central Oklahoma*

Laser immunotherapy (LIT) is a novel cancer treatment modality that focuses on using laser irradiation and an immunoadjuvant to instigate a systemic immune response to treat metastatic cancers. In order to accurately observe, improve, and plan the LIT process, a method to visualize and track tumor metastases is necessary. This study aims to develop this very methodology as a complement to LIT by identifying and analyzing metastases. We plan to accomplish this using contrast-agent assisted Magnetic Resonance Imaging (MRI). These contrast agents can be conjugated to antibodies specific to cancer markers, targeting the effect to cancerous tissues in an MRI scan. To begin development, a study was performed using Wistar Furth rats injected with DMBA-4 cancer model to analyze the influence of several types of molecularly-targeted contrast agents and ascertain the most efficacious contrast agent. From our results, we concluded that the Gd-alb-CD44v6 contrast agent was more effective than our other contrast agents. Hereafter, we plan to further this methodology by developing algorithms to computationally analyze the MRI data, enabling us to conduct studies to refine LIT into a more potent treatment.

### **05.08.23 Effect of electrospin material on the fracture strength of Ti/PMMA interfaces**

**Andrew,Rutter** *University of Central Oklahoma*

**shahram,Riahinezhad** *University of Central Oklahoma*

The goal of this research is to increase mechanical interlock between titanium (Ti) and poly methyl methacrylate (PMMA) cement by improving the surface properties of implant using electrospin nanofiber. To achieve the goal, the study will determine the effect of electrospinning polymer fiber adhesion on titanium and the effect of electrospinning fiber material architecture (fiber diameter and distance between fibers) on Ti/PMMA interfaces. An uncoated cylindrical model was tested under static structural loading. During this study, the fiber material viscosity of PCL-Acetone, PMMA-Acetone-PCL, and PCL-Acetic acid was measured. This study compared the bounding strength of two electrospun fiber coated Ti/PMMA interfaces under static load (the strength load between titanium rods with cement, and titanium rods with fibers and cement). Qualitative adhesion tests showed that PCL-PMMA-Acetone solution had greater stickiness compared to PCL-Acetone. Experimental study found significant increase of pull out static strength for fiber coated implant compare to uncoated implant. In future, the effect of electrospun fiber material on the architecture on Ti and compare the bounding strength of two electrospun fiber coated Ti/PMMA interfaces under static load will be found. In addition, the stiffness on fracture strength (PCL-Acetone and PCL-Acetone-PMMA) will be found.

### **05.08.24 Data Acquisition System for Fluid Dynamics Research**

**Lillian,Seay** *University of Central Oklahoma*

The proposed project will be designed to examine the flow in microjunctions using cutting-edge entropy generation techniques. Using these techniques, we will have an alternative view of how a fluid behaves during microfluidic flow. This will give other researchers a better understanding of the energy losses in any microfluidic system. My research project is to create the most efficient data acquisition system that will process all of the analog inputs from mechanical sensors and change those analog signals into accurate digital representations. The types of sensors disseminated throughout the microchannels are pressure sensors and flow meters, which measure the pressure and velocity of the fluid flowing through the system. I am currently working on a programming code to expand the amount of analog inputs by using an external analog to digital converter. This will allow more pressure sensors and flow meters to be used. Therefore, we can acquire more data and have a better picture of what is going on in the microchannel.

## **05.08.25 Finite Element Analysis of a Human Lumbar Vertebra**

**Kyle,Hodges** *University of Central Oklahoma*

**Morshed,Khandaker** *University of Central Oklahoma*

Degenerative disc disease is a chronic condition affecting millions of people around the world. Due to genetics or traumatic injuries, the outer layer of the two-part intervertebral disc (IVD), known as the annulus fibrosus (AF), is damaged and becomes scarred, causing it to lose its structural integrity, leading to the degeneration of the inner layer of the IVD, or the nucleus pulposus (NP). As the degeneration continues, water content is lost from the gelatinous NP, thus diminishing the shock absorption properties of a healthy NP. While prior operative solutions were limited to disc fusion (replacing the defective IVD with bone to eliminate rubbing of two vertebrae), modern approaches are looking at replacing the defective disc with a prosthesis. This aims to maintain the natural and complex motion of the spine while maintaining natural stress distributions. Due to complex geometries and 6 degrees of freedom: compression (up/down), translation (left/right), and rotation in either direction. Implementing finite element analysis (FEA) software on modeled intact lumbar vertebrae opens the door into further understanding of the stresses occurring while offering a digital platform for design and virtual implementation of proposed artificial disc replacements. By using the FEA program ANSYS, the results under compression load were closer than that of prior attempts at UCO.

## **05.08.26 Effects of Varying Organic Loadings on Bio-Sand Filter Performance**

**Adrian,Saenz** *Oklahoma State University*

**Eli,Shepherd** *Oklahoma State University*

**Kevin,Vo** *Oklahoma State University*

**Tyler,Autry** *Oklahoma State University*

With the introduction of bio-sand filters to developing communities, large populations of people have gained the ability to steadily supply clean water for their families. Bio-sand filters work by using physical straining and biological absorption to capture harmful bacteria from dirty water sources, allowing potable water to pass through the filter media. The challenges of bio-sand filters are that the original filter design cannot handle high concentration of organic material, thus the filter applications are limited. The purpose of this research is to calculate the theoretical maximum and minimum concentration of organic material that a typical bio-sand filter can process. During this experiment, six bench scale cylindrical bio-sand filters were created and loaded with three different organic concentrations. The results of the experiment showed that in every group, bio-sand filters steadily reduce the coliform counts over a time period of two to three weeks, until eventually converging to an absolute minima coliform count. These results clearly show that there is a lower limit to the amount of coliform that a filter can prevent from entering the human body and that at high Total Organic Carbon (TOC) loadings, removal of coliform bacteria is significantly more when compared to lower TOC loadings.

## **05.08.27 Martian Greenhouse Design for eXploration HABitat**

**Geoffrey,Kibble** *Oklahoma State University*

Long duration, manned space missions to Mars create many challenges for the industry, and logistics of sustainability present some of the most significant questions. Mars' pattern of orbit brings it closest to Earth once every two years, and this is the optimal time to send payload on the two to three hundred day journey. Because of the lengthy gap between optimal launching times, designs for terrestrial missions to Mars must provide storage capable of holding two years' worth of supplies or include the ability to self-sustain. Fresh grown foods are essential for sustainability, and without sustainability, manned missions to Mars will continue to be science fiction. Regular frequent shipping is implausible for replenishing supplies on Mars; even the amount of fuel required to send this large payload during the optimal time poses a problem. This cost alone raises questions about the feasibility of such missions. In order to successfully place a station on the Martian surface, the mission design must include a means for producing food, thereby creating some degree of self-sustainability. Oklahoma State University is investigating various methods for producing food on the Martian surface as part of the 2015 eXploration Habitat (X-Hab) Academic Innovation Challenge sponsored by NASA and the National Space Grant Foundation. Our team is analyzing possible designs in search of the most feasible and useful concepts and will produce a full-scale model to prove their viability.

## **05.08.28 Evaluation of the Long Term Viscoelastic Properties of a Silicone Gel**

**Mikasa,Barnes** *University of Central Oklahoma*

**Morshed,Khandaker** *University of Central Oklahoma*

The goal of this research is to determine whether the biomechanical performances of the intervertebral disc (IVD) after a nucleotomy can be mimicked with the use of a silicone gel replacement. We hypothesized that a silicone sample with a 1:1 base to cross-linker ratio may serve best as a replacement. To test this ratio, we evaluated the fatigue viscoelastic properties (creep, oscillation, recovery, and compression) of a silicone gel formation and determined the in vitro performance of the silicone using a cadaver IVD model under several loading conditions. The oscillation tests were evaluated on shear stress values varying from 0-50Pa with a fixed frequency of 1Hz to a controlled stress of 1.25MPa at a varying frequency from 1-100 radians per second. Bovine specimens were also prepared for use of comparison with various new materials in order to validate our results. Stiffness of intact and implanted IVD under the loading conditions of flexion, compression, bending, and rotation has been measured to evaluate the amount of restoration due to the silicone replacement. These results were then compared to the natural bovine specimens that were carefully prepared throughout the semester. The two materials' results correlate strongly, further suggesting that the 1:1 silicone may be an excellent choice. Our results are being used to develop a model to evaluate the usefulness of the implants used for the treatment of degenerated IVDs.

## **05.08.29 Design and Construction of a Micro Fatigue Tester for Small Animal Models**

**Charles, Collins** *University of Central Oklahoma*

**Hakan, Olasmis** *University of Central Oklahoma*

**Morshed, Khandaker** *University of Central Oklahoma*

**Ryan, Jordan** *University of Central Oklahoma*

**Zack, Johnson** *University of Central Oklahoma*

There is currently no commercially available fatigue tester for testing on the micro or nano scale. This type of testing would allow for improvements in nano fiber applications in small models. The models would include an intervertebral disc (IVD) model and rabbit femur Implant model. The IVD model will include a silicone disc with aligned fibers along the edge of the disc and random fiber caps on the top and bottom. The rabbit femur model will use a titanium rod in the center with Poly Methyl Methacrylate (PMMA) bone cement covering a portion of the rod; this model tests the strength of the boundary with and without the application of aligned nano-fibers. The goal would be to perform a cyclic load on each of these models while simultaneously collecting data about deflection and load. The tester will also perform a static test on both models that will be compared to previous data for calibration.

## **05.08.30 EFFECT OF FIBER ARCHITECTURE ON THE FRACTURE STENGTH OF IMPLANT/BIO-MATERIAL INTERDFACES**

**Morshed, Khandaker** *University of Oklahoma*

**Yanling, Li** *University of Central Oklahoma*

Ti and Ti-based alloys are widely used as implants for hard tissue repair. However, the optimal surface properties of an ideal metal implant have not yet been achieved. The goal of this study is to improve the bio-mechanical performances of Ti implant. It is hypothesized that deposition of fiber can increase mechanical interlock of Ti surface that can enhance in vitro mechanical integration of Ti/cement or Ti/bone interfaces. The research objectives were to (1) test the fracture strength of Ti-cement with one round, two rounds and five rounds of PCL fiber under static load to determine the stiffness effect of fiber on the Ti/PMMA cement interface; (2) test the fracture strength of Ti-cement with PCL fiber and PCL-PMMA fiber under static load to determine the topography effect of fiber on the Ti/PMMA cement interface; (3) test the fracture strength of Ti-fiber-cement with and without heating up Ti before fiber under static load to determine the thickness effect of fiber on the Ti/PMMA cement interface. PCL and PCL-PMMA fibers were produced by electrospinning. The result showed one round of PCL fiber has higher fracture strength than two rounds and five rounds. With PMMA added into the fiber solution, the fracture strength of Ti-fiber-cement increased. Heating up the Ti implant to 50°C before coating PCL fiber can increase the fracture strength of Ti-cement interface. However, heating up Ti implant before PCL-PMMA fiber doesn't help improve the quality of Ti-cement i



### **05.08.31 Metamaterial-Inspired Aerospace Structure for Improved Low-Frequency Acoustic Performance**

**ANUJ,REKHY** *Oklahoma State University*

**James,Manimala** *Oklahoma State University*

**Joseph,Aiken** *Oklahoma State University*

Conventional acoustic absorbers used in aerospace structures such as foam, fiberglass or acoustic liners are impractical for low-frequency (LF) noise ( $\sim < 400$  Hz) which contributes to detrimental effects like environmental noise pollution, excitation of airframe vibration modes and reduction of cabin comfort. Research is currently underway at Oklahoma State University to develop a Metamaterial-Inspired Aerospace Structure (MIAS) delivering improved LF acoustic performance in addition to primary load-carrying capability. Metamaterials are manmade structural materials that derive their unique dynamic behavior not just from material constituents but more so from engineered configurations. Inspired by metamaterials, we utilize mass-loaded stretched membrane-type vibro-impact attachments on a baseline structure to create an effective LF acoustic barrier. Incident LF waves are up-converted via impact to higher modes in the backing structure for subsequent dissipation in conventional absorbers. Preliminary testing on 3D printed test articles in an impedance tube demonstrates filtering of LF spectrum to reduce peak transmitted pressure. MIAS prototype is being experimentally evaluated for proof-of-concept. Successful transition to applications will contribute to making commercial aviation more sustainable and enabling new mission capabilities for military vehicles. Moreover, this tunable, passive mechanism is amenable to multifunctional integration for energy harvesting and sensing.

### **05.08.32 Theoretical Analysis of Microwave Heating of Spherical Shaped Foodstuffs**

**Mohammad,Hossan** *University of Central Oklahoma*

**Timothy,Collins** *University of Central Oklahoma*

The aim of this research is to find a closed-form solution to the 3-D temperature distribution in a dielectric, spherical shaped object when subjected to the heating of electro-magnetic waves of the microwave frequency range. Such a solution can be put to good use in the food industry, as the design of microwavable food is important. Primarily because microwave heating is non-uniform, and for food safety, a minimal cooking temperature must be met. Knowledge of the potential temperature distribution, in closed-form solution, of spherical shaped foodstuffs would allow better and easier design of microwavable food. To obtain such a solution, Maxwell's Equations, Vector Potentials, and the Poynting theorem are used to find an expression for the heat generated by the EM wave in the dielectric medium. This heat generation term is then plugged into the Heat Equation. Manipulation of the Heat Equation will follow using advanced integral transformations to obtain an analytical solution for the temperature distribution in the dielectric sample. As the project stands, a solution for the EM field distribution has been determined. This EM field will be used to evaluate heat generation distribution within the foodstuff. As the incident EM wave is planar, the power distribution within the spherical object will be non-uniform, and the localized heating will be heavily dependent on the angle, and frequency, of the incoming EM wave.

### **05.08.33 Design and Testing of a Biomimetic Flagella Propulsion Beam**

**Kenneth, Bush** *University of Central Oklahoma*

**Keren, Song** *University of Central Oklahoma*

Cilia and flagella are organelles that protrude from the surfaces of many cells, and whose architecture is highly conserved from protists to humans. These complex organelles, composed of over 500 dynein proteins, can be either immotile or motile. Cilia and Flagella are hair like structure that propel cells or move materials in airways and other passages. They are composed of nine outer microtubules doublets that surround a central pair of microtubules. The movement is generally characterized by the bending waves along the length of the flagellum so that a propulsive thrust is developed more or less along the length of the flagellum. How these bending waves are created is not completely known. Our goal for this project is to design and test a physical model that mimics flagella/cilia structure and movement. The research and modeling are based off of what is already known about the structure of cilia and research that has been performed by Dr. Gang Xu in his Biomechanics Research Lab. The deliverables are used to accomplish this: (1) Finite element model based testing to better understand and design the structural mechanics of flagella, (2) Design and build a passive biomimetic beam that mimics that mechanics of flagella, (3) Use an electromechanical device to make the beam active.

### **05.08.34 Design and Construction of a Portable Tensile and Fatigue Testing Apparatus for Small Animal Models**

**Morshed, Khandaker** *University of Central Oklahoma*

**Ryan, Jordan** *University of Central Oklahoma*

There is currently no commercially available fatigue tester for testing on the micro or nano scale or an apparatus that is portable. Current testing apparatuses are not easily moved due to their size and weight. Being portable would allow for the testing to be done in the same location where the model was made reducing the possibility of contamination of the sample. Nano scale testing would allow for improvements in nano fiber applications in small models. The models would include an intervertebral disc (IVD) model and rabbit femur Implant model. The IVD model will include a silicone disc with aligned fibers along the edge of the disc and random fiber caps on the top and bottom. The rabbit femur model will use a titanium rod in the center with Poly Methyl Methacrylate (PMMA) bone cement covering a portion of the rod; this model tests the strength of the boundary with and without the application of aligned nano-fibers. The goal would be to perform a cyclic load on each of these models while simultaneously collecting data about deflection and load. The tester will also perform a static test on both models that will be compared to previous data for calibration. Currently the tester can generate a sinusoidal waveform while receiving data from a load cell and DVRT.

### **05.08.35 Audio Recognition with Applications in Security Monitoring**

**Blair,Baldrige** *Oklahoma State University*

Recognizing the environment around us is an important part of everyday life, and it allows us as human beings to make decisions necessary to perform tasks, or achieve specific goals. For us this is easy we are born with the ability to feel, taste, see, smell and hear, but for a computer or Surveillance system these are not easy tasks. This work is going to describe a technique that can be used in order to perform sound source localization, and audio recognition using a circular microphone array. For the audio recognition algorithm we will explore the extraction of Mel-Frequency Cepstral Coefficients (MFCC's), Zero Crossing Rates (ZCR's), Short-Time Energy (STE), and Spectral Flatness (SFM) as features. Some of these features might contain redundant information, so we will also explore the use of a feature selection algorithm, which will minimize the total number of features extracted, while maximizing the number of correctly classified events. A Gaussian Mixture Model (GMM) is used as a classifier, and created from the extracted features during a training process. After the GMM's have been created the extracted features from the incoming audio are compared to the models for audio classification. The sound source localization algorithm can be used to detect the direction of arrival (DOA) to a particular source. The sound source localization algorithm with audio recognition will allow the surveillance system to determine whether a threat is present.

### **05.08.36 Determining an Optimal Media System for Multiple Cell Types Within a Lung Model**

**Brooklin,Ryan** *Oklahoma State University*

**Heather,Falhenkamp** *Oklahoma State University*

**Trey,Simpson** *Oklahoma State University*

We have developed a Tissue Equivalent Respiratory Model (TERM), which mimics the in vivo lung, and may be used to understand pulmonary disease mechanisms and the effects of therapeutics. The aim of the current study is to understand the effect of various media systems on the growth and differentiation of primary human lung cells. The media systems tested included defined media systems specially formulated for endothelial and epithelial cells, the defined epithelial cell medium with the addition of endothelial cell growth supplements, and a universal media system of RPMI-1640 with 10% fetal bovine serum and 1% penicillin, streptomycin, and L-glutamine solution. The methods included the culture of pulmonary epithelial, fibroblast, and endothelial cells, and the characterization of the seeding efficiency, growth rates, morphology, and viability in multiple culture systems. Our results showed that the epithelial and endothelial cells grew optimally only in their respective, defined culture media; and both failed to survive or showed a dramatically different morphology in any other media system. The fibroblast cells grew in all the tested media systems; however, the cells had the highest growth and viability rates in the endothelial cell media and grew poorly in the epithelial cell media. The results of this study demonstrate the complexities of a co-culture system and have resulted in a new protocol for culturing multiple cell types within the TERM.

### **05.08.37 To Drive or Be Driven**

**Amanda,Adney** *Southwestern Oklahoma State University*

**Cindi,Albrightson** *Southwestern Oklahoma State University*

**Ingrid,Law** *Southwestern Oklahoma State University*

**Madeline,Baughner** *Southwestern Oklahoma State University*

**Rachel,Hurt** *Southwestern Oklahoma State University*

The NASA Human Exploration Rover Challenge was created by NASA to allow students to be involved with NASA's deep space challenges and to give students a valuable experience with the various tasks and technologies required to design, manufacture, and test a lunar rover that is durable and capable of performing on various types of environments. NASA requires that each team have at least one female and one male driver. This attempt to get more women involved in male dominated fields has been successful to an extent; yet, there is still not enough importance put on female involvement. By observing the other teams in 2014 it seemed that female roles involved promoting team spirit, decor, paperwork, organizational duties or simply fulfilling the driver requirement. Although these are all necessary applications to the project, females should not be solely utilized with these duties. Other jobs that females, like males, can contribute to include the designing, manufacturing, and testing of the rover vehicle. We will be comparing our research from the other competing teams to Southwestern Oklahoma State University, who avidly encourages females to be a part of all aspects of the team jobs. For our research, we will conduct face to face interviews and anonymous surveys with female and male members from all willing competing teams. These interviews and surveys will inquire how the females from the teams were utilized and how they feel about their involvement on their teams.

### **05.08.38 Control Mechanism Modeling of Human Cardiovascular-Respiratory System**

**Qi,Cheng** *Oklahoma State University*

**Sandeep,Gutta** *Oklahoma State University*

According to the World Health Organization, non-communicable diseases like cardiovascular and respiratory diseases are a leading cause of deaths in the world. About 17.3 million people died from cardiovascular diseases in 2008 (about 30% of global deaths). It is possible to predict several cardiovascular and respiratory diseases in advance with right diagnostic information and tools. Mathematically modeling the underlying physiological systems will greatly help in providing accurate diagnostic information. It allows us to accurately quantify the complex interactions between several systems, and predict certain diseases in advance which alter the normal system function. The mechanisms of the cardiovascular and respiratory systems are highly interconnected with each other. In this research, we consider the local control mechanism of the cardiovascular-respiratory system during the transition from awake state to stage 4 non-REM sleep state. A discrete-time model of the cardiovascular-respiratory system with transport delays is considered. The system model is nonlinear and not first-order Markov. We convert the system into a first-order Markov process. We propose an iterative algorithm to find the optimal control inputs that drive the cardiovascular-respiratory system from awake state to sleep state. In each iteration, we linearize the system using the nominal state and input sequences. We perform simulations to show the effectiveness of the proposed method.

### **05.08.39 Indoor Multiple Sound Source Tracking Using Refined TDOA Measurements**

**Longji, Sun** *Oklahoma State University*

**Qi, Cheng** *Oklahoma State University*

Sound source tracking has numerous applications, including speaker localization, video conferencing, and smart home design. Time differences of arrival (TDOAs) of sound signals are usually used as the measurements for tracking. In our work, the multiple sound source tracking problem is formulated into a state estimation problem, where the state of one source includes both its coordinates and velocities in a two-dimension space. Since the TDOAs are nonlinear functions of the states, the traditional Kalman filter is not suitable. Instead, the particle filter is used to approximate the posterior distribution of source states using the "particles". The random finite theory is used to deal with the measurement association issue in multiple source tracking. Obtaining accurate TDOA measurements in indoor environments is challenging due to the presence of multiple sources and reverberations. To get more accurate TDOAs and thus reduce the gap between the measurement model and the measurements, a new approach is adopted. Preliminary TDOAs are estimated at selected time frequency data points, and a TDOA histogram is formed. The final TDOAs are obtained by determining the values corresponding to the peaks of the resulted TDOA histogram. Experiments are conducted to demonstrate the effectiveness of the proposed method.

### **05.08.40 Research Work on a Possible Setup for Microprocessors & Embedded Controls classes**

**JACK, LI** *Southwestern Oklahoma State University*

There is a big change in microprocessor field. Recently, 8-bit CPUs are being replaced by the advanced 32-bit CPUs, such as ARM CPUs at the same price. 8-bit CPUs are normally used in microprocessor classes while markets ask to use new 32-bit CPUs. Because there are so many functions added to the new CPUs, program designing becomes so complex that it is hard to design software from low level to application level. Using operating systems, such as Linux or QNX, in a microprocessor system is a common way to solve these problems. Operating systems design is very complex, especially for 8-bit systems. Even an embedded operating system is used, there are still more hardware and software designs, such as driver or Board Support Packages (BSP) design. All these new design methods are normally not covered in microprocessor classes. It is so important introduce these new changes to students in order to help them to face to new market. In this project, we try to setup a class to help students to learn these general processes, which include how to setup development system in Linux, how to read and design basic interface circuits as well as embed Linux into systems. The students can get a whole idea how to use the advanced CPUs as well as 8-bit CPUs, which can help students to handle new design requirements from market.

#### **05.08.41 Immobilization of Cardiac Troponin I (cTnI) in a Microfluidic Substrate**

**Jennie,Allen** *University of Central Oklahoma*

**Mohammad,Hossan** *University of Central Oklahoma*

**Regina,Smith** *University of Central Oklahoma*

**Steven,Karpowicz** *University of Central Oklahoma*

**Thiago,Omena** *University of Central Oklahoma*

**Tucker,Teigland** *University of Central Oklahoma*

Immobilization of proteins on a microfluidic device is critical for on-chip detection and signal amplification for low abundant biomolecules. The concentration of cardiac biomarker protein troponin I (cTnI) is extremely low in serum which prevents its detection in microchip device. In this project, we present an O<sub>2</sub> plasma assisted cTnI immobilization method to complement isotachophoretic concentration and detection of cTnI. Reactive ion etching (RIE) was used to treat the PMMA surface using oxygen plasma to increase surface area. This caused the surface to become hydrophilic, which aided in selective absorption of proteins. The anti-cTnI monoclonal anti-body (mAb) sample was applied manually in the detection site and allowed to incubate for approximately 1 h. After incubation, the surface was washed with PBST followed by nanopure water. After drying, the immobilization of antibodies was verified by respective fluorescent cTnI isoforms under a microscope. The image analysis was done using imageJ software to quantify the increase of cTnI concentration due to antibody amplification by measuring intensity. Currently the project is in progress and we are anticipating a hundred fold increase in cTnI concentration. This immobilization method will be integrated with the on-chip isotachophoresis for development of microfluidic immunoassay for diagnosis of myocardial infarction (MI).

#### **05.08.42 Experiments of Air-flow in Damaged Human Trachea for Surgical Planning**

**Grant,Armstrong** *University of Central Oklahoma*

Currently there are no standardized tools for visualizing stenosis repair before the surgery is attempted. The overall goal of this project is to create a standardized procedure that will allow surgeons to predict the results of a trachea surgery before the surgery is attempted. The goal of this research is to verify the simulation results that have been obtained by constructing a physical test system. A computational tool has been developed that takes MRI and CT scans of a damaged trachea and simulates airflow through the trachea that will allow for the prediction of surgeries on damaged tracheas. An experimental system has been designed and constructed that will experimentally verify these computer simulations. Experimental models have been designed in Solidworks® that will replicate a trachea. One model simulates a trachea with no stenosis and the other replicates a trachea with a stenosis. A system has been designed and constructed to deliver air at constant speed and pressure through the trachea models. The pressure drops and flow rates obtained from the system will be compared to the simulations that have already been run.

#### **05.08.43 Water from Light: Solar Powered Water Filtration For Use in Disaster Afflicted Areas**

**Ahmed,Al Sultan** *University of Central Oklahoma*

**Ali,Al Sultan** *University of Central Oklahoma*

**Joseph,Alwali** *University of Central Oklahoma*

**Kama,Miller** *University of Central Oklahoma*

Every year disasters, both natural and man-made, around the globe affect the availability of drinkable water to tens of thousands of people. By designing a solar powered water filtration system we are providing a viable solution to this issue. With any natural disaster, energy availability is also limited. Instead of depending on traditional energy supplies, such as gas or propane powered generators, we are utilizing the more easily obtainable solar power.

#### **05.08.44 Stationarity's Effect on Forecasting the Oil Price**

**Boshra,Karimi** *Oklahoma State University*

It is obvious that unexpected and persistent fluctuations in the real price of oil are playing a main role to the welfare of both oil-importing and oil-producing countries. Additionally, some economy sectors rely on the oil price forecasting for their success. This paper uses oil prices from January 1979 to August 2014 obtained from datamarket website. This study tries to discover whether or not the price of oil is a stationary time series by evaluating the effect of stationarity without considering any seasonality. The results show that the non-stationary model is the better one to forecast the oil prices. The rest of the paper introduces the two different models and justifies the fitness of these models based on ACF, PACF, EACF, BIC, and Time Series plots. Then, a residual analysis and over parameterization were conducted to evaluate the validity of these models. Finally, 3 months of forecasting was completed ahead of oil price data in order to compare the projected results with actual results. It was concluded that the nature of the original data set is non-stationary, so the differenced of log data should be modeled to forecast the future of oil prices.

## **Abstracts from the 2015 Oklahoma Research Day**

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

#### **05. Mathematics and Science**

#### **09. Environmental Science**

##### **05.09.01 DETERMINING THE EFFECTS OF LAND USE CHANGES AND CLIMATE VARIABILITY ON RESERVOIR SEDIMENTATION FOR THE LITTLE WASHITA RIVER EXPERIMENTATION WATERSHED**

**Hollie, Skibstead** *Redlands Community College*

In the 1930's, the United States experienced a period of severe dust storms known as the Dust Bowl, caused by severe drought and lack of proper farming methods. Lack of vegetation combined with isolated periods of intense rainfall caused increased erosion and flooding. As a result of the Flood Control Act of 1936, the Washita River Basin (WRB) was one of eleven pilot watershed projects chosen to construct flood control reservoirs. These reservoirs were implemented to prevent and manage soil erosion and flooding. A total of 45 reservoirs were installed between 1969 and 1982 in the Little Washita River Experimental Watershed (LWREW) within the WRB. This study sought to determine the impact of land use changes and climate variability on reservoir sedimentation. The main focus was determining the soil physical properties such as bulk density and soil texture. Sediment cores were collected from ten reservoirs using state-of-the-art coring system. The cores were cut, weighed, and dried to determine the bulk density of each sample. After determining the bulk density, samples were tested in the lab using the hydrometer method to determine the soil texture. Results indicated that variability of bulk density were significantly impacted by land use changes and climate variability for the areas contributing to the respective reservoirs, while the soil textural analysis showed results consistent with previous research and analysis performed for the contributing areas within the LWRE.



### **05.09.02 UV Photoactivation of Titanium Dioxide Nanoparticles: Enhanced Photo-oxidation of Natural Organic Matter in Aqueous Systems**

*Linzi, Thompson East Central University*

Titanium dioxide nanoparticles (TiO<sub>2</sub>-NPs) are becoming increasingly abundant in the environment due to their use in commercial products. TiO<sub>2</sub>-NPs also accumulate in wastewater treatment plant biosolids, which are then applied to the land as fertilizer. In this study, TiO<sub>2</sub>-NP photoactivation and subsequent photo-oxidation of natural organic matter (NOM) in aquatic systems was investigated. Three sources of NOM were used, including NOM present in nearby aquatic systems. 95% of the ultraviolet (UV) radiation that reaches the earth's surface is UV-A, and thus the role of UV light (UV-A and UV-B) was also investigated. Further, the role of naturally occurring minerals that could interact with TiO<sub>2</sub>-NPs and how they impact the photocatalysis of TiO<sub>2</sub> was evaluated. Measurements of total organic carbon (TOC) were used as an indirect indicator of the photo-oxidation of NOM in the aqueous samples. Results indicated that NOM photo-degraded faster in the presence of TiO<sub>2</sub>-NPs than in systems free of TiO<sub>2</sub>-NPs. These results are consistent with UV photoactivation of TiO<sub>2</sub>-NPs, enhanced hydroxyl radical formation, and NOM photo-oxidation. The colloidal particles had little effect on the rate of NOM photo-oxidation relative to colloidal-free systems despite (1) the larger relative size of colloids and the potential blockage of UV light on TiO<sub>2</sub>-NP inactivation, (2) the scattering or absorbance of the UV light, and (3) the complexation between TiO<sub>2</sub>-NPs and mineral surfaces.

### **05.09.03 Occurrence of typical antibiotics in Huai River and Hongze Lake, eastern China**

*Linzi, Thompson East Central University*

The presence of antibiotics in the aquatic environment, particularly in lakes and rivers, has increased with the rapid development of the world economy. Today, between 100,000 to 200,000 tons of antibiotics are consumed globally per year with China alone consuming 12-25% of this value. Research on antibiotic contamination in many water bodies of China has been conducted. In this study, the economically important Hongze Lake, the Huai River, and the wastewater treatment plant (WWTP) of Laozishan Town in eastern China were examined for background antibiotic concentrations. Water and sediment samples were collected from six locations in this region, including near fish farms and the WWTP outlet waters, influent, and effluent. These samples were analyzed for five common antibiotics: norfloxacin (NOR), oxytetracycline (OTC), enrofloxacin (ENF), ofloxacin (OFL), and ciprofloxacin (CIP). OTC was not detected in any samples, and OFL was only detected in the WWTP influent and effluent, indicating this location as a potential source of OFL contamination into the environment. NOR and ENR were found in all samples, with NOR occurring in the greatest concentrations. The WWTP was over 75% efficient at OFL and ENR removal, but only 4% efficient at NOR removal. Based on these results, NOR appears to be of greatest concern to environmental contamination in this region. These background levels and results should be useful to future study in this region and on this subject.

#### **05.09.04 Exploring the Role of Microbial Alkaline Phosphatase on Soluble Reactive Phosphorus Levels in Stream Water.**

*Deborah, Hyde Northeastern State University*

This study examines the role played by the enzyme, alkaline phosphatase (AP) which is excreted by microbes found in stream water and sediment beds. Since the levels of soluble reactive phosphorus (SRP) are connected with water quality, the ability to quantify the effect of microbial transformations between forms of phosphorus is useful to researchers and environmental managers. This study accesses samples of stream water above, at and below the sediment surface, comparing the levels of SRP and AP activity. Four sites were chosen in the Illinois River watershed in Oklahoma from which to sample at the prescribed depths.

#### **05.09.05 How can Cameron University Made Recycling More Convenient and Accessible to Students and Faculty?**

*Corrine, Binnings Cameron University*

Though academic enrichment is the main focus of most universities and colleges, there should be a focus on molding students into more rounded and responsible citizens. A part of this molding should involve fostering and encouraging an awareness of environmental issues. A simple and effective way to get students actively involved and learning more about their social and environmental responsibility is to start a recycling program on the college. To promote student participation in such an initiative, this study explores how Cameron University can make recycling more accessible to students and faculty and how students and faculty will respond to a more extensive recycling program. Through on-site observation, interviews and surveys done on Cameron University campus, and the assessment of the success of similar programs at other universities, we found that students and faculty had a positive response to the idea and expressed a willingness to support a recycling program that would make recycling more convenient and accessible. Based on research findings, a specific solution for promoting the program was created: With the aid of an annual Recycling Poster Competition, students can become active participants in the program and will learn more about recycling as they work on their posters. These very posters will be displayed on campus to make fellow students and faculty more aware of the program and its impact on environment.

## **05.09.06 Interpreting Time Series: A Novel Approach to Data Processing**

**Jeremy, Massengill** *University of Central Oklahoma*

**Paul, Stone** *University of Central Oklahoma*

**Sean, Lavery** *University of Central Oklahoma*

The ability to discern between information-bearing patterns (signals) and random patterns that distract from the information (noise) is invaluable to ecological and climatological sciences. An important factor in climate change studies is the ability to detect significant changes in the structure or function of the environment. Tracking and interpretation of temperature time series can be used to gauge the severities of climate change. Historically, generalized linear models (GLM) and the autoregressive integrated moving average (ARIMA) model provided a means of forecasting from time series. We have developed a novel computational method for the analysis of temperature time series and prediction of hydroperiod. Using data obtained from temperature data loggers set in temporary aquatic environments we can predict the presence/absence of water using the temperature time series. Our method combines Newton's Law of Cooling with modern statistical processes to detect significant differences between comparable temperature time series. We used mathematical modeling of the temperature tracking exhibited by the data logger with respect to the environment (ambient air or liquid water) to process data and assess statistical significance. The computational method for evaluating time series developed in this study is not limited to aquatic habitat availability but also can be useful in climate change detection, tree ring analysis, animal behavior studies and signal detection/process

## **05.09.07 The Oklahoma Water Resources Center: Leading Collaborative Efforts on Protecting Water Quality in the Illinois River Watershed**

**Chad, Penn** *Oklahoma State University*

**Daniel, Storm** *Oklahoma State University*

**Garey, Fox** *Oklahoma State University*

**Leslie, Elmore** *Oklahoma State University*

Water quality, especially related to phosphorus concentrations, has been an issue in the Illinois River Watershed in northeastern Oklahoma for decades. Recent improvements in water quality have been reported due to reduction in point source discharges; however, research has also recently highlighted the extent of legacy nutrients stored in streambanks and the magnitude of their contribution to phosphorus loading to streams. The objective is to overview critical water quality research being conducted at Oklahoma State University on understanding phosphorus sources, transport, and storage within the Illinois River Watershed. Research to be discussed includes Water Center sponsored and/or funded grants on watershed modeling identifying the sources and transport of phosphorus, streambanks as sediment and phosphorus sources, and also phosphorus treatment structures to capture dissolved phosphorus in runoff. Also, the Oklahoma Water Resources Center (<http://water.okstate.edu>) and Arkansas Water Resources Center recently hosted a joint symposium, sponsored by the Cherokee Nation Environmental Programs in September 2014. The symposium ended with a facilitated-discussion on future research and outreach/education needs. This presentation will provide an overview of the findings regarding future research and outreach priorities. The Center's website (<http://water.okstate.edu/irw>) provides access to symposium presentations, videos, and identified research/outreach needs.

### **05.09.08 The Formulation, Physical and Chemical Characterization of Dairy Free Lentil Yogurt Compared to Traditional Yogurt**

**Carissa,Jetto** *University of Central Oklahoma*

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

The need for allergen free, non-intolerant and probiotic foods continues to grow around the world. Agar-Agar is used to substitute lactic acid in the lentil yogurt to stimulate growth of the lactic acid bacteria. The goal was to produce a product that would be comparable to traditional dairy yogurt using identical strains of lactic acid bacteria. The lentil yogurt recipe was optimized by testing different ratios of lentils to water and different methods of inoculating the lentil milk and when to mix in the agar-agar. The three batches were tested against the traditional yogurt in acidity at the end point, viscosity, brix or sugar content, and total solids. The traditional yogurt was formulated using dairy milk (2% fat) heated to 165oF and cooled to 110oF and then inoculated with the Danisco yogurt culture. Final pH of lentil yogurt was 4.6 when compared to traditional yogurt (4). The moisture content of optimized lentil yogurt was slightly higher (91.2%) then dairy yogurt (84.2%). The results of the viscosity test showed almost no difference between lentil and traditional yogurt samples. New Dairy Free Lentil Yogurt was formulated and characterized in this study. This new yogurt would be an addition to a growing market and cost effective alternative to soy and coconut based yogurts.

### **05.09.09 The Effect of Aerobic Exercise on Cue Reactivity in Cases of Alcohol Use Disorder**

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

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

It is well known that the student population is known for having poor eating habits. The purpose of the research is to better understand the nutrition problems college student's face and the best way to target them for a nutrition intervention. Focus groups will be conducted with UCO students to determine the primary factors that effects food choices (i.e is it lack of food choices at UCO, lack of knowledge about food types, or simply the college lifestyle). This information will be used to develop an intervention and the ability of an educational program to change the behavior and lifestyle of these students. Findings from the focus groups will be presented at Oklahoma Research Day.

**05.09.10 Effect of Mining Byproducts on Mammalian Cell Viability: A Study of the Tar Creek Superfund Site**

**Alejandro,Torres** *Tulsa Community College*

**Alex,DeLeon** *Tulsa Community College*

**Dusti,Sloan** *Tulsa Community College*

**Eric,Bates** *Tulsa Community College*

**Jeffrey,Bleichner** *Tulsa Community College*

**Nicol,Whinery** *Tulsa Community College*

**Nnamdi,Ekese** *Tulsa Community College*

**Tyler,Noble** *Tulsa Community College*

The Tar Creek Superfund site spans Northeastern Oklahoma, Southeastern Kansas, and Southwestern Missouri. Mining began in the 1700s and lasted until 1970. Contaminants from the mining process, primarily lead and zinc, are still present in the soil, surface water, and ground water. The purpose of this study was to evaluate whether contaminants from the Tar Creek Superfund Site were detrimental to mammalian cells grown in vitro. Water samples were collected from different areas of the site and tested for chemical contaminants using a water quality kit. Additionally, the effect of the water samples on mammalian cell viability was evaluated by utilizing the water samples to create growth media for a mammalian cell line (CHOK-1). The cells were seeded in 96-well tissue culture plates and allowed to adhere for 48 hours. Media was made using control water, mine site well water, downstream "mixed" water, and main inlet (from the mine) water and was added to specified wells in the culture plate. The cells were then incubated in their respective media for 5 days. An MTT viability assay was utilized to assess the viability of cells grown in different media types. Water quality testing did not reveal abnormal levels of contaminants in any of the test sites. Results from the MTT assay indicate that there was significant loss of viability in cells grown in media prepared from the NE Inlet and Well Site.

## **05.09.11 Table Top Exercises as a Tool for University Infectious Disease Planning**

**Bethany,Ragle** *East Central University*

The recent outbreak of the Ebola virus in Western Africa proves that infectious disease emergencies are a serious threat to any part of the world. Universities are especially at risk for disease outbreaks due to students living in close quarters, having large numbers of shared bathrooms, and having large communal dining facilities. Because epidemics are unpredictable in characteristics such as onset, severity, spread, and treatment, universities should practice responding to varying types of outbreaks. With the support of university administration, I planned and facilitated a table top exercise at East Central University to assess infectious disease preparedness, increase awareness of business and education continuity needs, and increase comfort level making decisions in a crisis. During the table top, integral university staff and community stakeholders discussed and responded to scenarios involving increasing cases of seasonal flu, shortages of flu vaccine, staff and faculty absenteeism, an on campus case of Ebola, and a resulting community wide panic. After the scenarios, participants identified gaps in the communicable disease planning process and generated a list of recommendations for the university. These recommendations included developing and practicing an emergency preparedness plan that includes infectious disease, developing an academic contingency plan, furthering communication with community stakeholders, and communicable disease training for university staff.

## **Abstracts from the 2015 Oklahoma Research Day**

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

#### **05. Mathematics and Science**

#### **10. Forensic Science**

##### **05.10.01 A Bio-Forensic Study of the P63 Protein during the Stages of Wound Healing and Postmortem: A Fourier Transform Infrared (FTIR) Spectroscopy, histopathology, and immunohistochemistry protocol.**

**Mohamed,khadiri** *University of Central Oklahoma*

Wound healing and wound age determination remain as some of the most challenging areas of both clinical and forensic pathology research. Cutaneous wounds and injuries are any intrusions or damages to the body's epidermal tissue surface. When it comes to cutaneous wounds, there is a great deal of knowledge that ought to be understood and later used for valuable applications both in a clinical and in a forensic setting. However, there are many challenges both medically and forensically facing the research behind wounds and wound healing pushing one to further explore many aspects of such topic. In the medical field there are many challenges in terms of wound treatment especially that of chronic wounds due to the diverse health conditions under which the healing process exists, progresses, and/or stops. In the forensic field however, the challenge is to closely determine the timing of wounds and injuries. In this study we are investigating a Post Mortem Interval (PMT) of wounds and wound vitality in terms of the inflammation and the proliferation of tissue before and after death using a protocol that combines the Fourier Transform Infrared Spectroscopy (FTIR), histopathology, and Immunohistochemistry techniques.

## **Abstracts from the 2015 Oklahoma Research Day**

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

#### **05. Mathematics and Science**

#### **11. Genetics**

##### **05.11.01 Functional Analysis of Major Depressive Disorder Related Human Genes**

**Ashley,Floyd** *Southeastern Oklahoma State University*

**Hannah,Bourne** *Southeastern Oklahoma State University*

**Madison,Stanglin** *Southeastern Oklahoma State University*

**Maria,Bonilla** *Southeastern Oklahoma State University*

**Ning,Wu** *Southeastern Oklahoma State University*

Major depressive disorder (MDD) is a mental disorder that affects about 10% of the population worldwide. The disease has been the leading cause of disability in recent decade, and is potentially fatal to some patients who may commit of suicide eventually. Previous studies have confirmed that MDD is a multi-gene involved disease, which shows the wide variants in both clinical manifestations and genetic variations. This retrospective study is to explore the types, genome locations, and functions of current reported MDD related human genes to investigate the potential mechanisms of MDD's multi-system phenomenon. The study found total 147 expressed genes that related to MDD, which include the genes involved in cellular structure formation and function, cellular enzymatic activities, and signal transduction pathways. Among them, multiple organs/tissues are also involved, which include genes expressed in liver, kidney, skeletal muscle, brain, eyes, and endocrine system. The finding of this study suggested that MDD patients might have multiple gene expression level changes, and therefore, might have the functional changes of multiple organs/tissues and systems. That may explain why most MDD patients always complain for multiple systemic symptoms, but do not demonstrate any structural abnormality in clinical examinations.



### **05.11.02 The Study of Blood-based Potential Molecular Markers for Major Depressive Disorder Diagnosis**

**Jeanea, Mitchell** *Southeastern Oklahoma State University*

**Kailyn, Ward** *Southeastern Oklahoma State University*

**Landi, Munholland** *Southeastern Oklahoma State University*

**Ning, Wu** *Southeastern Oklahoma State University*

**Rebecca, Teafatiller** *Southeastern Oklahoma State University*

Major depressive disorder (MDD) is a mental disorder and affects multiple functions of the body. Previous studies showed that human peripheral blood cells shared more than 80% of the transcriptome with nine different tissues including brain, which indicated that circulating blood could reflect the states of health or disease within the brain. Currently, MDD diagnosis is based on clinical survey. There is no effective laboratory means to provide objective diagnosis for MDD. This retrospective study is based on previously reported, MDD-related gene profile to investigate the genes expressed in peripheral blood to explore the potentials of those genes as molecular markers. The results showed that there were 14 out of total 147 MDD related genes demonstrated statistical significance in their peripheral blood expression level difference between normal and MDD groups. Among them, 10 genes showed significant reduction of their expression levels in MDD patients' peripheral blood comparing to that in normal person while 4 genes showed remarkable increased expression levels. The results of this study will facilitate the development of potential peripheral blood MDD molecular markers, which will benefit the accurate diagnosis of MDD.

### **05.11.03 Sequencing of Plasmids Carrying Genes for Ofloxacin Resistance**

**Ashley, Bonea** *Northeastern State University*

**Cindy, Cisar** *Northeastern State University*

**John, de Banzie** *Northeastern State University*

**Kayla, Schroeder** *Northeastern State University*

Antibiotic resistance in bacteria presents great challenges in the healthcare field. Infections that were once treatable have become bigger threats to the public health due to the presence of resistance genes in bacteria. The environmental sources of resistance genes and the mechanisms behind their spread are therefore important. We are interested in resistance to the antibiotic ofloxacin. Ofloxacin enters bacterial cells and inhibits the enzyme DNA gyrase. DNA gyrase prevents superhelical strain on the DNA during replication by acting as a swivel point. When DNA gyrase is inhibited the cell cannot replicate or repair its DNA and dies. Several resistance mechanisms are known, including efflux pumps that expel the antibiotic and mutations in DNA gyrase that render it insensitive. We are interested in resistance due to a plasmid-carried gene, *qnrS*. This gene encodes a protein that prevents ofloxacin from binding to DNA gyrase. Ofloxacin-resistant aeromonads were collected from sediments downstream of a wastewater treatment plant. Strains containing plasmids bearing *qnrS* genes were identified. We are sequencing plasmids from two of these strains using primer walking. The sequences obtained will be compared with *qnrS*-bearing plasmid sequences from other ofloxacin-resistant isolates from different dates and locations. This comparison should allow us to assess the number of different *qnrS*-bearing plasmids present and whether *qnrS* resistance genes are being transmitted between bacte

#### **05.11.04 Silencing of autophagy genes in Drosophila shows that the Ard1 gene plays a role in cell death.**

**Joseph, Wells** *Northeastern State University*

**Joseph, Ahlander** *Northeastern State University*

Our world is facing a cancer epidemic that is a threat to all societies and us personally. Ard1 is a protein encoded by a gene that is conserved in Eukaryotes and is directly linked to cancer progression and other human diseases. The Ard1 protein could be instrumental in regulating autophagy, a cellular pathway that deals with degradation and disposal of obsolete and unusable cellular constituents. Model organisms, such as *Drosophila melanogaster* can be used to study cancer and autophagy. Through genetic analysis, we switched off the Ard1 gene during eye development and eye surface areas were considerably smaller than the control flies. We hypothesized that the reduced eye size is because the cells were indeed dying. One way that cells can die is through the pathway of autophagy. To test whether Ard1 silencing causes autophagic cell death, we silenced autophagy genes Atg1 and Atg101 by RNAi. We found that by silencing these Atg genes, the phenotypes measured were actually larger, indicating a decrease in cell death and autophagy. These results support the idea that reduction in number of cells is due to overactive autophagy. Understanding the effects of the Ard1 gene could possibly lead to future treatments for the cancer epidemic in humans.

**Abstracts from the 2015 Oklahoma Research Day**  
**Held at Northeastern State University**

**05. Mathematics and Science**

**12. Kinesiology**

**05.12.01 Physical Training for Parkinsons Disease: Pilot Study**

**Amanda,McClelland** *University of Central Oklahoma*

**Jacilyn,Olson** *University of Central Oklahoma*

**John,Ahrens** *University of Central Oklahoma*

**Kyle,Covey** *University of Central Oklahoma*

**Lacey,White** *University of Central Oklahoma*

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

The purposes of this study were to assess the feasibility of a simultaneous physical fitness and speech therapy treatment program for individuals with Parkinson's disease (PD) and to report changes in functional fitness, balance, and speech components. A group of eight individuals with PD (58-82yrs) volunteered. Participants' initial functional fitness was measured by performance on the Senior Fitness Test (SFT) and the MINI-BEST Test (MBT). After initial measurement, a group training program of 60-minute sessions, three times a week for four weeks was administered. The protocol consisted of a warm up, strength and endurance exercises, static and dynamic balance training, and flexibility/cool down. Voice training was administered simultaneously. Modifications were included for individuals to maintain own pace while partaking in group activities. Upon program completion, the SFT, and MBT, were again assessed to monitor progress. RESULTS: Physical measures: significant improvements ( $p<0.05$ ) were found in chair stands, arm curls, 8 foot up and go, and the dynamic balance portion of the MBT. CONCLUSION: Combined training improved functional fitness, balance, and select speech parameters in adults with PD. Data and participant feedback determined the program to be feasible. More research is needed to determine if these changes can be attributed to the combination of voice and physical fitness training as opposed to separate interventions.

## **05.12.02 Palm Cooling's Impact on Resistive Exercise Performance.**

**Ashley,Clark** *University of Tulsa*

**Jake,Martin** *University of Tulsa*

**John,Caruso** *University of Tulsa*

**Jon,McArtor** *University of Tulsa*

**Lacey,Mitchell** *University of Tulsa*

**Rachel,Perry** *University of Tulsa*

**Rachel,Baptista** *University of Tulsa*

**Roman,Edwards** *University of Tulsa*

**Samantha,Vickers** *University of Tulsa*

Introduction: Hyperthermia impairs various physiological functions. Conduction to remove body heat entails contact with cold objects; by creating large thermal gradients, heat dissipates. Underneath the hand's palmar surface lies anastomoses, blood vessels that expedite the removal of body heat. Methods: To assess palm cooling's impact on physiological changes from exercise, 35 subjects performed three four-set leg press workouts while receiving one of three treatments: no palm cooling (NO PC), palm cooling between sets (PC BTN), or palm cooling between sets and for 20 minutes post-exercise (PC BTN & POST). Between sets of the PC BTN and PC BTN & POST workouts, subjects placed their left hands in 15°C water for 100 seconds. Average power (AP) was measured per set. Results: Each dependent variable had at least one significant main effect; three (AP, left hand skin temperature, blood lactate concentration) also exhibited two-way interactions. Left hand skin temperatures showed NO PC, PC BTN > PC BTN & POST at several time points. Data from "high responders" ( $\geq 40^\circ\text{C}$  hand temperatures) underwent an additional analysis that also elicited an interaction with PC BTN > NO PC > PC BTN & POST at multiple time points. Blood lactate results showed NO PC > PC BTN, PC BTN & POST at 0-minutes post-exercise. AP outcomes saw PC BTN, PC BTN & POST > NO PC for set four. Conclusion: Palm cooling hastened heat removal and lactate clearance, as well as delayed AP decr

**Abstracts from the 2015 Oklahoma Research Day  
Held at Northeastern State University**

**05. Mathematics and Science**

**13. Mathematics**

**05.13.01 Using Cauchy's Theorem**

**Karina,Chavez** *East Central University*

This project draws on various aspects of abstract algebra dealing with Abelian groups—specifically, cyclic groups. In order to show that a particular Abelian group (of order 33) was cyclic, I focused on showing that it was true by using Cauchy's theorem instead of some other means. This project first identifies necessary definitions and theorems and this is followed by a thorough examination of the proof.

**05.13.02 Fascinating Properties of 153**

**Adrienne,Pinkstaff** *Northeastern State University*

The number 153 has many unusual properties. This project explores the properties of 153 with a focus on its narcissistic character. A proof is presented for the number 153 being the eventual sum of the cubes of digits of numbers divisible by three after a given number of cycles.

**05.13.03 Roots of polynomials and their applications**

**Akinola,Akinlawon** *Cameron University*

**Ioannis,Argyros** *Cameron University*

We introduce a special class of real recurrent polynomials of degree  $n$ , ( $n$  a natural number) with unique positive roots, which are decreasing as  $n$  increases. The first root as well as the last root are expressed in closed form and enclose all in between roots. Some applications are also provided in this study.

#### **05.13.04 Determining the Topological Connections Between Diamond and Lonsdaleite**

**Michael,Fulkerson** *University of Central Oklahoma*

**Wenwen,Li** *University of Central Oklahoma*

Diamond and Lonsdaleite are two different allotropes of carbon that have hexagonal lattices. Their structures have different symmetry characteristics, but the symmetry alone is not able to fully reflect the differences between Diamond and Lonsdaleite. The purpose of this project is to determine the topological differences between the two structures by fundamental group theory and covering spaces. In this project we calculate the deck transformation groups of Diamond and Lonsdaleite.

#### **05.13.05 Antitumor Laser Immunotherapy: A Mathematical Model and Analysis**

**Bryan,Dawkins** *University of Central Oklahoma*

**Sean,Laverty** *University of Central Oklahoma*

We present a mathematical model describing the immune-mediated dynamics of primary and metastatic tumor cell populations treated with laser immunotherapy. We explicitly model dendritic cell and cytotoxic T cell dynamics in the immune response to treatment. Also included in the model are tumor antigens, which are tumor-specific proteins released during tumor irradiation by laser and tumor cell death via cytotoxic T cells. We present the qualitative cases that our model simulations predict as a function of key parameters directly influenced by regulatory T cells. Using these key parameters, we describe conditions for successful and unsuccessful treatment. The qualitative cases of our model simulation will be compared to experimental tumor burden data.

#### **05.13.06 An ANALYSIS on the BEIGE BOOK'S DALLAS DISTRICT**

**Ashley,Huhman** *East Central University*

The Beige Book is an anecdotal and economically relied report released through the Federal Reserve. My research will explore comparing the anecdotal to the factual data gathered from a variety of sources. Through rigorous statistical methods and testing, we will demonstrate evidence for comparison. Results will either show economic relevance or that testing needs to continue.

### **05.13.07 Mathematical Observations of Ventral Horn Cells in *Xenopus Laevis***

**Brittany,Myers** *University of Central Oklahoma*

**Lance,Ford** *University of Central Oklahoma*

The number of cells that live in the ventral horn region of the *Xenopus Laevis* have been recorded in a paper by M.C. Prestige. The cells can be observed as living and degenerating cells. One leg was amputated at different stages and for each amputation the number of cells in the ventral horn were recorded. In our research, we used the data to model the behavior of cells in the ventral horn using age-structured partial differential equations. We use this model to study the behavior of cells in the ventral horn.

### **05.13.08 Estimates on Minimal Perfect Order Subset Groups**

**Michael,Fulkerson** *University of Central Oklahoma*

**Shanta,Ghosh** *University of Central Oklahoma*

In this research we explore a certain class of finite groups, called perfect order subset groups. A group is said to have perfect order subsets (POS) if the number of elements of any given order divides the order of the group. The study of these groups involves both number theory and abstract algebra. These groups were first defined and investigated by Carrie Finch and Lenny Jones. We explore here both abelian and nonabelian POS groups, and we find a size estimate on minimal POS groups whose order is not divisible by 5.

### **05.13.09 Summations and Squares**

**Vikki,Orso** *East Central University*

This presentation looks at some commonly used summation formulas and also look at how the geometrical shape of a square connects to them. We prove these formulas using a couple of different methods, some algebraic and other geometric, and show how the square connects through a proof of induction.

### **05.13.10 Population Dynamics of *Myotis Velifer* in Oklahoma**

**Brenden,Balch** *University of Central Oklahoma*

**Sean,Laverty** *University of Central Oklahoma*

Cave bats or *Myotis Velifer* have distinct population patterns that change year to year. This project uses mathematics to model population dynamics of *Myotis Velifer* in Oklahoma caves. More specifically, the bats that stay in Oklahoma during the wintertime are investigated. It is thought that the resident bats that stay and hibernate have the greatest influence on the overall population patterns of *Myotis Velifer* in Oklahoma. The baseline model will be extended to look at other factors that could affect the population of cave bats, including weather, diseases, and other environmental factors.

### **05.13.11 Multiple Solutions for a Fourth Order Boundary Value Problem**

**Britney,Hopkins** *University of Central Oklahoma*

**Kristi,Karber** *University of Central Oklahoma*

**Olivia,Bennett** *University of Central Oklahoma*

**Thomas,Milligan** *University of Central Oklahoma*

This poster describes a process for transforming a fourth order differential equation into a system of second order equations satisfying homogeneous boundary conditions. We follow this by providing proofs of two lemmas that give estimates on a defined operator. These lemmas in conjunction with two others allow for the application of the Guo-Krasnosel'skii Fixed Point Theorem, which yields multiple positive solutions.

### **05.13.12 The Effect of Platelets on the Degradation of Blood Clots**

**Ara,Han** *University of Central Oklahoma*

**Brittany,Bannish** *University of Central Oklahoma*

Fibrinolysis, the degradation of blood clots, is initiated by tissue-type plasminogen activator (tPA). However, tPA is inhibited by a molecule called PAI-1, which is secreted by platelets. The presence of both PAI-1 and platelets affects how easy the clot is to degrade. Thus, we use mathematics to study how the configuration of platelets and the presence of PAI-1 affects the degradation of clots. We investigate how the distribution and the different amount of platelets and PAI-1 affects the degradation rate by using a stochastic model to count the fibers in a blood clot as time progresses.

### **05.13.13 M-harmonic Functions on the Unit Ball**

**Michael,Fulkerson** *University of Central Oklahoma*

We investigate properties of a class of real-valued functions on the unit ball in  $n$ -dimensional complex space, called  $M$ -harmonic functions. These functions are defined by a differential operator, called the invariant Laplacian. An important result is that a function on the unit ball is the real part of a holomorphic function if and only if it is both harmonic and  $M$ -harmonic.



### **05.13.14 An Initial Heuristic to Dynamically Generate a Student's Optimal Course Schedule**

**Bradley,Paynter** *University of Central Oklahoma*

**Kristina,Sundy** *University of Central Oklahoma*

**Spencer,Harris** *University of Central Oklahoma*

Minimizing the number of semesters a student must take in college before graduation can help students find a paying job faster, minimize per-semester fees associated with the college, and reduce transportation, housing, and food costs for the student. This type of problem is an optimization problem requiring the creation of a schedule to minimize a given resource (in this case, semesters taken). The problem is complicated by several constraints; for example, the dependencies courses have on each other. In this project, a complex degree program including many dependencies and several concurrent dependencies was examined. Previous work has developed a heuristic based on the Program Evaluation and Review Technique (PERT) and the critical path method (CPM). This heuristic finds the critical courses and has been implemented in C++. The next stage of development is another heuristic to turn this critical path information into an actual schedule of courses. We present the implementation details of the former heuristic and the initial progress on the latter.

### **05.13.15 Developing a Station Rotation Schedule for Vacation Bible School**

**Bradley,Paynter** *University of Central Oklahoma*

**Janice,Ford** *University of Central Oklahoma*

**Ryan,Hoffpauir** *University of Central Oklahoma*

Many day camps for children (like Vacation Bible School) are run on a station model. That is, children are divided into groups and activities are divided into stations. The groups of children then move between activity stations on a pre-arranged schedule. This system has several advantages including that regular transitions work well with children's short attention spans and volunteers only have to deal with small groups of children at a time. The disadvantages to this system are that it may not be the most efficient use of volunteer labor and scheduling by hand can be a complicated endeavor. We model this problem as an Open Shop Problem with unit processing times and modify standard algorithms to work with constraints specified by a customer organization.

### **05.13.16 Saving Lives One Ambulance Trip at a Time**

**Bradley,Paynter** *University of Central Oklahoma*

**Jake,Burdine** *University of Central Oklahoma*

**Jordan,Michela** *University of Central Oklahoma*

**Robert,Smith** *University of Central Oklahoma*

In emergency situations, a person may lean towards calling 911 for an ambulance. From the scene of the accident, the victims are rushed to a hospital where their injuries can be taken care of. When you have multiple hospitals in the area, which one would be best to send the patient to? Problems could result from having a shortage in doctors, a delay, no rooms available, or even no one specializing in that specific injury. So how do you come up with the best solution without worsening the condition of the patient? How do you get to see the doctor in the quickest way possible? If one hospital is full of very severe injuries, is it possible that driving to the furthest hospital would be the best for that patient? We model this problem using Queueing Theory.

### **05.13.17 Vector Matrix Representations of Non-Associative Moufang Loops of Order $2n$ .**

**Kyle,Reeves** *East Central University*

Moufang loops are quasigroups which contain an identity element and satisfy the Moufang identities. A method published by Orin Chein details the construction of non-associative Moufang loops of order  $2n$  from non-abelian groups of order  $n$ . The feasibility and utility of representing certain of these with vector matrices is examined.

### **05.13.18 Distinguishing the Distinguishing Game Number for Graphs**

**Connor,Allen** *Northeastern State University*

The distinguishing number for a graph is the minimum number of colors required to color the vertices of a graph so that the only color preserving automorphism that exists is the identity. The game distinguishing number is the minimum number of colors needed so that Alice is always able to provide a distinguishing coloring of the graph in play against her adversary, Bob. It is known that the distinguishing number is less than or equal to the game distinguishing number for any given graph. This creates an interesting question: Can we use the game distinguishing number to provide sharper upper bounds for the distinguishing number? To find out more about game distinguishing numbers for graphs we created a program to play the game over a wide array of graphs. In this game Alice and Bob are presented with a generated graph. They try and decide which vertices, of the uncolored, to color and which color to use on that said vertex that still allows for an eventual distinguishing coloring. Each player gets a turn until all vertices are colored. This is automated to make the best choice possible. We will then examine the results and talk about our findings.

### **05.13.19 Direct Numerical Simulation of the Origin of Flow Chaos at Late Boundary Layer Transition over a Flat Plate.**

**Manoj, Thapa** *University of Central Oklahoma*

The transition process from laminar to turbulent flow in boundary layers is a basic scientific problem in modern fluid mechanics and has been the subject of study for over a century due to its great importance in various engineering applications. Delaying laminar-turbulent transition definitely reduces the skin friction at the wall and hence reduce fuel consumption in many flows of practical interest. However, designing and optimizing devices for skin-friction reduction requires a fundamental understanding of transition mechanisms and phenomena. This paper is devoted to the investigation of the origin and mechanism of chaotic flow (asymmetric flow) in late boundary layer transition over a flat plate without pressure gradient. After carefully analyzing our recently conducted high order direct numerical simulation (DNS) results, we exhibit an entirely new approach about the origination and evolution process of flow chaos in late boundary layer transition. The direct relation between small scale vortices generation and skin-friction production, the mechanism of boundary-layer thickening are also discussed.

## Abstracts from the 2015 Oklahoma Research Day

### Held at Northeastern State University

#### 05. Mathematics and Science

#### 14. Optometry

##### 05.14.01 Peripheral Refractions in Myopic Children: Spectacles vs. Contact Lenses

**Clayton, Boyd** *Northeastern State University*

**Nathaniel, Edwards** *Northeastern State University*

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

**ABSTRACT** Purpose. Lenses designed to provide peripheral myopic defocus may slow progressive myopia. Our purpose was to compare peripheral optics of three clinical options for childhood myopia: 1) spectacles, 2) single vision soft contact lenses and 3) multifocal soft contact lenses. We hypothesized that multifocal soft lenses would provide the most peripheral myopia. Methods. Five myopic children were corrected normally with spectacles, single vision soft and multifocal soft contact lenses. We performed cycloplegic retinoscopy centrally and in 16 peripheral positions (full circle every 45 degrees, at two eccentricities each). Refractions were compared to see which correction mode provided the most peripheral myopia for each subject. We also measured higher order aberrations centrally. Results. Results were displayed on polar plots that allowed easy comparison of peripheral refractions. The correction mode with the most peripheral myopia varied between subjects. Multifocal soft lenses were best for only one subject and second best for three others. Central spherical aberration showed no correlation with peripheral defocus. Discussion. Among our subjects, multifocal soft contact lenses did not always provide the best optics for myopia control. Further study is needed. The methods we developed (peripheral retinoscopy and polar plots) may be helpful for future myopia research.

## **05.14.02 Survey of Teachers' Knowledge of Common Childhood Vision Disorders**

**Callie, Mosburg** *Northeastern State University*

**Whitney, Cox** *Northeastern State University*

Purpose: Vision is the most used sense for learning as 80% of learning is done visually. Disorders of the visual system can have a lasting impact on a child's development throughout life. The necessary skills for efficient reading include visual acuity, eye focusing, eye teaming, eye tracking, eye-hand coordination, and visual perception. The common childhood disorders that can negatively affect these skills are refractive error, binocular vision disorders (strabismus, amblyopia, accommodative dysfunction, and convergence insufficiency) as well as oculomotor dysfunction. Teachers are in a primary position to recognize symptoms and make referrals appropriately. Methods: Kindergarten through eighth grade teachers in the Tahlequah, OK area were sent an online survey to determine their comfort levels in recognizing the signs and symptoms of the most common childhood vision disorders. Results: We obtained 48 of 246 complete survey responses. We used regression analysis to analyze our data but found no correlation between years of teaching experience and comfort levels. Discussion: Overall, the majority of teachers surveyed was aware of vision and its importance in learning and most felt comfortable recognizing symptoms of vision problems and knowing when to refer.

## **05.14.03 Reproducibility of Anterior Chamber Angle Measurements using SD-OCT**

**Ryanne, Elmer** *Northeastern State University*

**Sara, Taylor** *Northeastern State University*

**Spencer, Johnson** *Northeastern State University*

Purpose. Our purpose is to evaluate the variability between observers when measuring the anterior chamber angle with the iVue SD-OCT. Methods. Anterior chamber angle scans were obtained of sixteen right eyes by the iVue SD-OCT. The angles were then measured by using the software's protractor by three optometry students to determine the reproducibility of the angle measurements. Results. When comparing observers 1 versus 2, 1 versus 3, and 2 versus 3 the mean differences were  $-1.3^\circ$ ,  $-0.88^\circ$ , and  $0.4^\circ$  respectively. The average absolute difference between observers were  $6.44^\circ$ ,  $4.96^\circ$ , and  $4.28^\circ$ . Conclusion. There is good interobserver reliability when measuring the anterior chamber angle using iVue SD-OCT. We believe that gonioscopy is still the gold standard and should not be replaced by SD-OCT due to the limited information that it provides. Key Words: anterior chamber angle, spectral domain optical coherence tomography, iVue

#### **05.14.04 Efficacy of Anti-Fatigue Single Vision Lenses**

**Dr. Mallorre,Dill** *Northeastern State University*

**Dr. Wesley,DeRosier** *Northeastern State University*

**Erica,Ngo** *Northeastern State University*

**Purpose.** Evaluate the efficacy of the new Hoya Sync™ 5 lens to relieve symptoms of asthenopia and to improve vergence and accommodative posture under visually stressful, sustained, near point tasks. **Methods.** We administered the Conlon Visual Discomfort Survey to 30 optometry students to collect subjective complaints of asthenopia. Using a Saladin card, we measured the subjects' fixation disparity prior to fitting them in a Hoya Sync™ 5 lens. After four days of continued lens wear, fixation disparity was re-measured through the reading segment of the lens and the Conlon Survey re-administered. Subjects were given a logging sheet to monitor duration and activity with wear. **Results.** We found the Sync™ 5 has a statistically significant effect on reducing occurrence of near symptoms of diplopia, aching, and soreness after four days of continued use. There was a moderate positive relation between number of hours of usage while performing near tasks and reduction in subjective symptoms. However, we found no statistically relevant changes in horizontal and vertical fixation disparity. **Conclusion.** We found that the Hoya Sync™ 5 provides improvement in symptoms of asthenopia as experienced by subjects. However, objective measurements of fixation disparity in this study were not statistically related to lens usage. **Key Words:** anti-fatigue lenses, asthenopia, fixation disparity, accommodation, Hoya Sync™ 5

#### **05.14.05 Comparison of Central Corneal Thickness using the iVue SD-OCT and Pachmate DGH-55**

**Jennifer,Chang** *Northeastern State University*

**Purpose.** To evaluate and compare CCT measurements with the gold-standard Pachmate ultrasound pachymeter and the newer less invasive iVue SD-OCT. Repeatability was evaluated for the iVue. **Methods.** Observational clinical study, 30 subjects over 18 years old. Exclusions: corneal astigmatism >2.0D, corneal anomalies, history of refractive surgery or contact lens wear within 24 hours. Each subject's right cornea was assessed using biomicroscopy, auto-keratometry, and iVue measurements were taken twice followed by the Pachmate. **Results.** The mean for the iVue and Pachmate were 530.23µm and 555.53µm, respectively. Overall mean for both devices was 542.88µm. Standard deviation of means was 29.90. The paired t-test for means was not significantly different after allowing for the consistent offset of 25µm (p=0.82). Utilizing Bland-Altman, the standard deviation of differences was 7.51µm. The iVue's repeatability index was r=0.997. Within-subject coefficient of variation was 5.59%. **Conclusion.** The iVue SD-OCT and Pachmate correlated very well with an offset of 25µm thinner readings with the iVue. This may be due to induced corneal edema from anesthetic or to inherent differences in the two instruments. Clinically, the readings did not show a significant difference. The iVue measurements were highly repeatable, allowing for accurate and consistent data. This study allows practitioners to utilize the less invasive, multipurpose iVue in practice to measu

## **05.14.06 InfantSEE Utilization by NSUOCO Optometrists**

**Alissa, Proctor** *Northeastern State University*

**Karli, Hubka** *Northeastern State University*

**Mikaela, Bolejack** *Northeastern State University*

The InfantSEE program has had a decrease in both the number of providers and the number of exams performed each year since it launch in 2005. We created a survey to evaluate the utilization of this program by Northeastern State University Oklahoma College of Optometry (NSUOCO) graduates to discover the reason for the decrease in exams performed. We created a survey using Survey Monkey. The survey contained ten questions that evaluated participants InfantSEE provider status, number of years practicing optometry, number of InfantSEE exams done per year, InfantSEE marketing strategies, how participants obtained education and training necessary to do infant eye exams, reasons for not participating in the program and if they felt comfortable being an InfantSEE provider. The survey was emailed out through Survey Monkey to graduates of NSUOCO. Survey Monkey collected the data and we analyzed it via regression analysis. Fifty percent of participants were registered InfantSEE providers, while the other half of participants reported that they were not. The majority of providers performed less than five InfantSEE exams per year. Regression analysis showed a strong correlation between the more ways the providers market the program the more exams they perform each year. We found that there is a relationship between marketing and the number of InfantSEE exams performed. We conclude that if more marketing is done for the program, more InfantSEE exams will be completed each year.

## **05.14.07 Color Vision Testing Among Practicing Optometrists**

**Anna, Thompson** *Northeastern State University*

**Haley, Wilson** *Northeastern State University*

**ABSTRACT Purpose.** A survey of optometrists to identify the frequency, type, and administration of color vision testing. There are currently no studies to determine how often color vision tests are performed, which tests are used, or whether the tests are being accurately administered under the specific testing conditions required. **Methods.** A survey was presented to optometrists at March 2014 Spring Oklahoma Association of Optometric Physicians Continuing Education (CE) Conference in Norman, OK. No participative incentives were provided. The surveys were collected anonymously and data analysis performed using Microsoft Excel. **Results.** The response rate was 138, of which 105 surveys were complete meaning all questions answered with the correct number of responses per question. Color vision testing is performed on every patient at every exam by 10.69% of optometrists. A screening only color vision test is used by 43.5% as their test of choice for diagnosing color vision anomalies. Inadequate fluorescent only lighting for test administration is used by 99% of respondents. **Conclusions.** Administering the correct color vision test under the correct testing conditions is crucial for accurate results. Given the importance of color vision testing, providing optometrists with tools, including continuing education, may help increase awareness of correct vision test administration.

## **05.14.08 Effect of blue-blocking spectacle lens coatings on subjective visual performance**

**Alan,McKee** *Northeastern State University*

**Jason,Manes** *Northeastern State University*

**Wyatt,Williams** *Northeastern State University*

We compared blue-blocking spectacle lens coatings to broad-spectrum anti-reflective coatings to assess the effect on gross subjective visual perception, reading speed when viewing an LED display, glare perception, and visual comfort. We fitted 29 pre-presbyopic subjects in three pairs of spectacles, each with a different lens coating. Two pairs were coated with a blue-blocking treatment (Hoya Recharge and Essilor Provencia) and other control pair was coated with a standard anti-reflective coating (Hoya EX3). For each treatment, we asked subjects to state whether they thought the lens had blue-blocking properties, measured reading speed on an LED display, then surveyed visual comfort, perception of glare, and likelihood to wear the lenses habitually. We found that subjects were able to determine whether lenses had blue-blocking coatings based on gross visual perception. There was no statistically significant effect on reading speed, visual comfort or perception of glare. Subjects reported that they were more likely to wear EX3 habitually than Provencia. We found that while subjects are able to determine that they are wearing spectacle lenses with blue-blocking coatings, the difference in visual perception does not statistically affect reading speed, visual comfort, perception of glare, or likelihood to wear the lenses.



## Abstracts from the 2015 Oklahoma Research Day

### Held at Northeastern State University

#### 05. Mathematics and Science

#### 15. Pharmacy

##### 05.15.01 Evaluation of the Physicochemical Properties of a Novel Antimalarial Drug Lead, Cyclen Bisquinoline

*A.S.S.,Rouf University of Dhaka, Bangladesh.*

*anjuli,shrestha Southwestern Oklahoma State University*

*Apoorva,Rudraraju Southwestern Oklahoma State University*

*Hardeep,Saluja Southwestern Oklahoma State University*

*M.O. Faruk,Khan Southwestern Oklahoma State University*

*Mohammad,Hossain Southwestern Oklahoma State University*

The purpose of this study was to evaluate physicochemical properties of a novel antimalarial drug lead, 4,10-bis (7-chloroquinoline)-1,4,7,10-tetraazacyclododecane (free base; FB) and its hydrochloride salt. Differential scanning calorimeter (DSC) was employed to determine and quantify the energy of phase transition and conformational changes. Equilibrium solubility and stability of both FB and its salt were carried out in different mediums, and samples were analyzed using RP-HPLC. pKa values were calculated by both pH-metric and UV-metric methods. The log P value of the compound was determined by RP-HPLC from the best fit calibration curve of log P vs. log k values of the reference standards. The FB is a white polymorphic crystalline powder; the polymorphs melt at 166, 178, 195, and 234°C, respectively. The salt is off-white powder that showed a broad endotherm in DSC analysis suggesting it to be amorphous. Both forms were stable in a wide range of conditions (acid, base, water, light and heat) except oxidation. Three pKa values, 5.9, 6.6 and 8.7, were obtained for the compound. It has a log P value of 5.14. The application of standard experimental protocol revealed that the compound has at least four different crystalline polymorphs. It is highly hydrophobic; however, salt formation improved its water solubility by approx. 370-fold. All these properties would be useful in implementing the modern quality by design approaches for further development of the drug lead.

### **05.15.02 UV-Metric, pH-Metric and RP-HPLC Methods to Evaluate the Multiple pKa Values of a Polyprotic Basic Novel Antimalarial Drug Lead, Cyclen Bisquinoline**

**anjuli,shrestha** *Southwestern Oklahoma State University*

**Cassandra,Obi** *Southwestern Oklahoma State University*

The purpose of this experiment was to evaluate and compare the pKa values of the poorly water soluble, weakly basic, novel antimalarial drug lead, 4,10-bis (7-chloroquinoline)-1,4,7,10-tetraazacyclododecane (CNBQ). Three separate methods, pH-metric, UV-metric, and reverse phase-high performance liquid chromatography (RP-HPLC), were employed to determine the pKa values between 2.0-12.0 pH range. The acetate and phosphate buffers, in addition to methanol and acetonitrile as co-solvents and potassium chloride to maintain the ionic strength, were used as appropriate. In UV-metric method, the drug substance is dissolved in aqueous media eliminating any interference of a co-solvent for measuring the pKa. Consequently, the pKa values obtained by the UV-metric method are considered accurate, as opposed to potentiometric and RP-HPLC methods that require the use of co-solvents. Thus, through the utilization of UV-metric method three pKa values, 5.9, 6.6, and 8.7, were obtained for CNBQ. These studies would be useful to determine the pKa values of the related drug leads under development.

### **05.15.03 Healthy Mouth, Healthy Heart**

**Angela,Mewherter** *Northwestern Oklahoma State University*

**Lauren,Martinez Scobell** *Northwestern Oklahoma State University*

**Lori,Shearer** *Northwestern State University*

Do patients that receive prophylactic antibiotics before a dental procedure have a decreased risk of developing infective endocarditis compared to patients that do not receive prophylactic antibiotics before a dental procedure? The prophylactic use of antibiotics has been highly recommended for dental procedures for many years. Since the American Heart Association updated their guidelines, the use of antibiotics prior to a dental procedure has greatly declined. Currently, it is recommended that patients only receive these antibiotics if they have a history of heart disease, congenital heart defects, heart transplant, past diagnosis of infective endocarditis, prosthetic valve or valve repair. The American Heart Association is changing the focus from prophylactic use of antibiotics to improved oral health overall. Antibiotics often have some negative side effects related to them as well as our bodies built immunity to these medications. The treatment regimen is often not followed as it should be, therefore, they are not as effective. The over use of antibiotic can decrease the effectiveness of the medication when it is needed for an infection. This research aims to show the use of prophylactic antibiotics prior to dental procedures is not always a necessity.

#### **05.15.04 Towards the Synthesis of N4O2-Type Metal Complexes of Antimalarial Macrocyclic Polyamine Ligands**

**Apoorva,Rudraraju** *Southwestern Oklahoma State University*

**M.O. Faruk,Khan** *Southwestern Oklahoma State University*

**Mohammad,Hossain** *Southwestern Oklahoma State University*

**Prabhjyot,Saluja** *Southwestern Oklahoma State University*

The purpose of this study is to synthesize a series of N4O2-type stable metal complexes of antimalarial macrocyclic polyamine drug leads. The synthetic strategy relies upon the well-defined regioselective synthesis of tetracyclic derivatives of cyclen and related polyamines. First step of the method started with the synthesis of cyclen glyoxal followed by the synthesis of 1,7- dibenzyl-cyclen glyoxal 1,7-bisquaternary ammonium salt. Hydrolyzing the salt leads to the formation of 1,7-dibenzyl-cyclen proceeded by the synthesis of 4,10-bismethylacetyl 1,7-dibenzyl cyclen. Hydrogenolysis was performed on this product to yield 1,7-bismethylacetyl cyclen. This product was further treated with 4,7-dichloroquinoline to obtain the 1,7-bismethylacetyl-4,10-bis (dichloroquinoline) cyclen. The N4O2-type metal complexes of the ligand will be synthesized by hydrolyzing this ester product to carboxylate, and then reacting with metals.

## Abstracts from the 2015 Oklahoma Research Day

### Held at Northeastern State University

#### 05. Mathematics and Science

#### 16. Physics

##### 05.16.01 The Slope Method Determination of the Acoustic Attenuation Coefficient of Liquids

*Karen, Williams East Central University*

In medical physics the use of ultrasound to detect anomalies in patients is commonplace. The detection of anomalies depends upon the rejection of artifacts and texture of normal structures; this is done using phantoms. The phantom may be thought of as the 'known tissue' that is imaged. Phantoms should better represent human tissue structure. The measurement of attenuation coefficients is useful in many industrial fields such as milk and juice production as well. This research focussed on using a slope method to determine the acoustic attenuation coefficient of glycerol and distilled water rather than a direct calculation of the coefficient from the intensity equation. The amplitude of the signals were measured and allowed the calculation of the attenuation at several distances. The slope of graph of the attenuation versus the distance the sound traveled yielded the attenuation coefficient for the liquid. This research was done using 1, 2, and 4 MHz ultrasound transducers and an echo scope. The attenuation coefficient for glycerol was found to be .009031-.03434 dB/mmMHz. Similar ranges in values were found in the literature. The attenuation coefficient of distilled water was found to be -.002817 to +.008154 dB/mmMHz. The literature was full of a variable range of values for distilled water as well. This appeared to be a better method for determining the attenuation coefficient.

##### 05.16.02 Whole Body-MRI Based Fat Measurement

*Ashma, Shiwakoti East Central University*

Body fat volume and fat distribution have significant medical implications in human pathology. The growing evidence that obesity is related to several metabolic disturbances such as insulin resistance, impaired insulin secretion, non-insulindependent diabetes mellitus (NIDDM), hypertension, and cardiovascular diseases, emphasizes the accurate measurement of the total body fat, subcutaneous fat, and the visceral fat. Two whole body Magnetic Resonance Imaging (MRIs) (2009 & 2011) were taken of a middle-aged female subject in a Caloric Restriction study. The axial DICOM-format images for each body region were imported and reconstructed in the visualization software Avizo®, and the body fat was manually segmented slice by slice. The segmented regions were merged together, and the fat volume of each region was calculated. The fat volume changes in two MRIs were evaluated, and the abdominal subcutaneous and visceral fat exhibited the greatest decrease in volume. Whole body fat segmentation using MRI scans and Avizo software gave a good depiction of the subcutaneous fat and visceral fat in the whole body.

### **05.16.03 Examining Polarimetric Characteristics of Electronic Interference in Weather Radar Data**

**Thong,Phan** *East Central University*

Meteorologists have been able to examine the atmosphere using weather radars to look at what kinds of precipitation have been occurring for many decades. With the recent upgrade to dual-polarization radars (dual-pol) for the WSR-88D (Weather Surveillance Radar 1998 Doppler), meteorologists can now examine the atmosphere with dual-polarization products. These products are: Velocity (V), Reflectivity (Z), Differential Phase on Propagation (PhiDP), Correlation Coefficient (RhoHV), Differential Reflectivity (Zdr), and Spectrum Width (SPW). Though the products are very useful in determining what type of precipitation are in the atmosphere, how large the precipitation event is, and how severe it can be, it picks up many non-meteorological echoes. Electronic interference is a type of non-meteorological echo that has high reflectivity values and is mistakenly forecasted as precipitation by automated systems. This study looks at the reflectivity, differential reflectivity, and correlation coefficient of electronic interference and precipitation to find objective criteria to distinguish a difference between them. The findings are meant to aid in the current quality control algorithm to be more efficient for operational use.

## **Abstracts from the 2015 Oklahoma Research Day**

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

#### **05. Mathematics and Science**

#### **17. Psychology**

##### **05.17.01 Hand Location Effects Object Recognition Times**

**Mickie, Vanhoy** *University of Oklahoma*

**Shanshan, Huang** *University of Central Oklahoma*

**Thomas, Taylor** *University of Central Oklahoma*

Hand position relative to visible objects may facilitate object perception times, possibly because objects near hands are likely to be important. Research has described the effects of having hands visible or occluded on response time and accuracy in a dual haptic-visual task using regressions and linear modeling to attempt explanations. Instead of forcing regression lines onto nonlinear data to fit decomposable models, I am using ideas from complexity theory to describe my thesis data. I am interested in coordinated systematic behavior over sustained tasks, so I am using a visual-motor task that requires participants to maintain a pattern of computer mouse movement whilst identifying letters briefly presented in the visual periphery. My Python program presents letters R and L at two randomized locations and collects mouse data at six moments per trial. The adaptive stimuli onset asynchronies (SOAs) are the temporal units of interest; they constitute a strophic time series that SPSS cannot accommodate so I am using R to perform Multifractal Detrended Fluctuation Analysis (MFDFA), Continuous Wavelet Transforms (CWT), and Wavelet Transform Modulus Maximus (WTMM). The multifractal fractal analyses afford detecting stable interactions and their associated correlations.

##### **05.17.02 Effects of Gender Norms and Heterosexism on Adoptions and Disgust**

**Evelyn, Stratmoen** *University of Central Oklahoma*

**Thomas, Hancock** *University of Central Oklahoma*

This study investigated how priming gender norms and heterosexism levels predicted homosexual discrimination in adoption cases along with evoking implicit disgust. Participants were primed with either pictures of gender normative activities, gender non-normative activities, or neutral nature scenes. It was found that priming participants did not affect adoption choices, contradicting previous findings.

### **05.17.03 The Curmudgeon Personality: Seeing the Positives and Just Not Liking Them**

**CHRISTOPHER, DITZFELD** *University of Arkansas*

**Jenel, Cavazos** *Cameron University*

**Kelsee, Monroe** *Cameron University*

**Problem** The current project examined inclinations for orienting to negative and positive emotional content in the curmudgeon personality. **Method** Participants included 141 students who voluntarily completed an online questionnaire study. The study included measures of dispositional negative attitudes (DAM), trait negative affect (PANAS), and avoidance temperament (BIS). Participants then completed a Word Fragment Completion (WFC) task, in which they were asked to fill in blank letters to create words (16 positive or neutral; 16 negative or neutral). **Results** As was hypothesized, dispositional negative attitudes were positively associated with the total number of emotion-based words created in the WFC task, even after controlling for trait negative affect ( $\beta = .17, p = .044$ ). However, contrary to expectations, dispositional negativity was not associated with a tendency to create more negative than positive words ( $\beta = .02, p = .774$ ). **Conclusion** The results of this study indicated that curmudgeons showed an inclination for generating both negative and positive words when presented with ambiguous word stimuli. Despite their apparent sensitivity to both positive and negative emotional stimuli, their overall negative disposition suggests that they do not particularly like stimuli of either valence, which could be due to the perpetually strong emotional state in which they inhabit.

### **05.17.04 The Impact of Support on Post Traumatic Stress Disorder in Military Personnel.**

**Stephanie, Lieber** *University of Central Oklahoma*

There is a trifecta of support that influences the development of Post Traumatic Stress Disorder (PTSD) in military personnel. The research has determined several ways of decreasing PTSD in military personnel: providing high levels of unit cohesion, perceived family support, and perceived social support. The most common technique that was used was surveys to determine the soldier's level of perceived support, along with general assessments and PTSD assessments given by the Department of Veterans Affairs.

## **05.17.05 Examining the Social Dynamics of Sexual Intent and Commitment Perception II**

**Amelia, Brewer** *University of Central Oklahoma*

**Gabriel, Rupp** *University of Central Oklahoma*

The aim of this study was to explore Error Management Theory (Haselton & Buss, 2000), replicating previous studies that examined perceived interest and commitment in men and women. In the current study, we employed a modified version of the instruments, using neutral terminology in order to include a broader demographic in terms of sexual orientation. We used the Bem Sex Role Inventory Scale of masculinity/femininity (BSRI) (Bem, 1978) to examine how these characteristics affect responses. This replication differs from our first study in that we used a wider range of recruitment tools through social media to gain a larger and more diverse sample size. The hypothesis for the current study was that women tend to under-perceive commitment and men tend to over-perceive sexual interest regardless of sexual orientation. Participants filled out an online survey with questions concerning potential relationship scenarios. The expected outcome is a gender difference on sexual intent between self-report ratings and perception of partner ratings, based on results from our previous study. Implications concerning sexual orientation and gender schema theory will be discussed.

## **05.17.06 The Effect of Aerobic Exercise on Cue Reactivity in Cases of Alcohol Use Disorder**

**Kaitlyn, McElroy** *University of Central Oklahoma*

Relapse remains a major problem in the treatment of alcohol use disorders (AUD). The use of exercise as an adjunct treatment reduces relapse in this population and decreases depression. A neurological marker for relapse and craving are increased P3 amplitudes in the cerebral cortex, which occurs in response to alcohol related cues in people with AUD. The aim of this study is to determine if participation in an aerobic exercise program such as kayaking can reduce P3 amplitudes and craving in response to alcohol beverage cues in persons with AUD. Twenty-four participants positive for an AUD will be randomly assigned to an 8-week kayak based aerobic exercise program or to a sedentary control group. Before and after the completion of the exercise program participants will view images of alcoholic beverages, non-alcoholic beverages and neutral images on a computer screen while P3 amplitudes are recorded. Craving will be assessed before and after alcohol cue exposure using the desire for alcohol questionnaire. It is expected that there will be a decrease in P3 amplitudes and craving during the alcohol cue reactivity task after 8-weeks of aerobic activity.



## **05.17.07 Fundamentalism Drives IQ Differences between Theists and Non-Theists**

**Alisa, Huskey** *University of Central Oklahoma*

**Caleb, Lack** *University of Central Oklahoma*

**Kathryn, Schrantz** *University of Central Oklahoma*

Conclusions drawn from research on the relationship of religiosity and intelligence are limited because methodology in studies of this potential relationship is incredibly variable. There has been very little consistency in the measures used to assess religious variables across studies. There is also little consistency across studies in how intelligence is typically assessed or even defined. Based on a review of literature, it was predicted that high levels of religious fundamentalism would be related to lower levels of intelligence. It was also predicted that there would be no relationship between general religiosity and intelligence once religious fundamentalism was taken into account. A total of 84 undergraduate students with a mean age of 20.58 years (SD = 3.98) participated in the study. WASI-II mean verbal IQ was 102.74, mean performance IQ was 101.15, and mean full-scale IQ was 102.26 for the total sample. Correlational analyses showed significant relationships between higher FSIQ and lower overall strength of religious faith ( $r = -.342, p < .001$ ), lower religious fundamentalism ( $r = -.313, p = .004$ ), higher certainty of non-existence of god ( $r = .317, p = .003$ ) and lower sense of personal specialness ( $r = -.324, p = .003$ ). To examine the relative strengths of these different aspects of, regression analyses were performed and showed that when fundamentalist beliefs are accounted for, general religiosity did not significantly predict IQ score.

## **05.17.08 What predicts college students' intentions to seek counseling?**

**Alisa, Huskey** *University of Central Oklahoma*

**Kyle, Haws** *University of Central Oklahoma*

**Veronika, Karpenko** *University of Central Oklahoma*

**Objectives.** A large number of university students struggle with anxiety, depression, and relational problems that negatively impact their academic performance and could lead to dropping out of the universities. Besides the expected stressors that come with pursuing higher education, young adulthood is also the onset for the majority of mental illnesses that respond well to psychological counseling. The present study examined students' intentions to seek counseling and how these intentions are affected by psychological distress, interpersonal problems, academic impairment, and recent distressing events. **Hypotheses.** Student's intentions to seek counseling will be predicted by higher levels of psychological distress, interpersonal or academic difficulties, and greater number of distressing events in the past three months. **Methodology.** 366 participants (76% female) between the ages of 18 and 49 ( $M = 20.8, SD = 4.7$ ) completed the measures: the Intentions to Seek Help for Hypothetical Distress, Willingness to Seek Help Scale, Outcome Questionnaire, Perceived Stress Scale, Distressing Events, and Academic Impairment. **Summary.** Regression analyses will be performed to examine how much variance is explained in intentions to seek counseling by psychological distress, perceived stress interpersonal or academic difficulties, and greater number of distressing events in the past three months.

**05.17.09 A Comparison of Self-reported Self-care Outcomes Following a Two-day Wellness Seminar**

**Elizabeth, Keller-Dupree** *Northeastern State University*

**Gregory, Gwin** *Northeastern State University*

**Jennifer, Rodriguez** *Northeastern State University*

**Jessie, Guidry** *Northeastern State University*

Wellness is defined as a way of life that is directed toward enhanced living through an integrated awareness of the mind, body, and spirit. Because wellness is a holistic counseling intervention, meaning that it focuses on individual physical, emotional, spiritual, social, and other components of overall health, it is a valuable topic to integrate not only into counseling practice but also into counselor-in-training experiences. The current study involved undergraduate and graduate participants completing an online two-day wellness seminar. Students were given pre- and post-tests of three assessments measuring levels of self-care, professional quality of life, and stress reaction. Results offer findings into the self-reported levels of self-care noted by students directly following completion of this experience. Implications for helping professional training and practice will be offered. Keywords: Wellness, Wellbeing, Experiential Education, Counselor Training

**05.17.10 Cultural Value Conflict, Problem Solving Skill, and Psychological Well-Being in 1.5 and 2nd Generation South Asian Indians in America**

**Eunice, Melakayil** *University of Central Oklahoma*

**Lorry, Youll** *University of Central Oklahoma*

Family structures within European Americans differ from those found in Asian Indian families, in which European American families are usually nuclear, egalitarian, and individualistic. For Indians, with collective values, the concepts of privacy, personal space, and individualism are diametrically opposed to that of European Americans. Many Indian immigrants struggle to reconcile the opposing values of their Indian culture with that of their host country. Generally, the younger immigrants, specifically the 1.5 and 2nd generation immigrants, want to be independent as they become more assimilated into the culture of their host country, but they do not at the same time want to disappoint their families. However, the older immigrants from the 1st generation usually cling tightly to their Indian values and fear the impact the host country's culture will have on their family structure. The goal of the current study is to examine cultural value conflict, interdependent and independent problem solving skills, and psychological consequences of cultural value conflict in 1.5 and second-generation South Asian Indian immigrants living in the United States. It is expected that higher ratings of cultural value conflict will be positively related to psychological distress and second-generation immigrants will have independent type problem solving skills as opposed to interdependent type problem solving skills with the 1.5 generation.

### **05.17.11 Understanding The Mirror Neuron System, Empathy, And Pain Recognition**

**Deon, Hall** *University of Central Oklahoma*

**Justin, Durham** *University of Central Oklahoma*

Empathy is a process activated by higher-order factors such as imagination of or direct perception of visual occurrences. Perceiving empathy is necessary for interpreting pain, making empathy a primary function of social interpersonal relationships. Support from recent research demonstrates that watching others experience physical pain activates brain regions related to the actual experience of pain itself. Mirroring is a basic learning function of the human brain and relies on intricate neural networks including the mirror neuron system (MNS). A lack of empathy and pain recognition, related to an inefficient mirror neuron system has potential to exhibit psychopathic traits. The purpose of this project is to determine if vicarious experiences of pain recognition and empathy relate with higher psychopathic traits. Additionally, evaluating neurological activity by electroencephalography (EEG) recording is a noninvasive and affordable technique for measuring the mirror neuron system. Electrodes will be placed according to the International 10-20 system to calculate difference in amplitude for evaluating relative frequency and power between active (+) and reference (-) electrodes. Participants will complete a prescreening packet containing the Short Dark Triad scale to measure Machiavellianism, narcissism, and psychopathy, and the Toronto Empathy Questionnaire. The expected outcome is that pain recognition will be positively associated with empathy by mirror neuron activation.

### **05.17.12 Attitudes, Impulse, and Mechanisms: The Who, What, and Why of Student Debt**

**Heather, Martin** *University of Central Oklahoma*

**Janelle, Grellner** *University of Central Oklahoma*

The significant debt of college students rises with each graduating class. The United States' increased use of credit cards ranks with the highest levels of bankruptcy rates in the world. The current research conceptualizes the components of student debt as financial attitudes, impulse control, and spending mechanisms. Up to 100 students from two undergraduate psychology courses will be assessed for financial attitudes and impulsivity using empirically supported scales. After assessment students will randomly participate in a payment group, the control group (combination of payment methods chosen by participants), a cash only group, or a card only group, for a four week period. At the conclusion of the spending period participants will submit receipts and statements for analysis and receive financial education resources provided by Oklahoma CPAs and Oklahoma Money Matters. We hypothesize poor financial attitudes and high impulsivity will result in increased spending overall, low impulsivity and conscientious financial attitudes will result in lowest spending overall, and students who use cash only will spend less than the card only or control group. We seek to identify specific individual and combinations of cognitive and behavioral processes involved in varying levels of student debt and to create a financial education program that generates awareness among college students and teaches the skills and perspective needed to graduate from higher institutions debt free.

### **05.17.13 Motor Synchronization and Team Coordination**

**Adam, Braly** *University of Central Oklahoma*

Empirical evidence from twenty years of motor coordination research has revealed that patterns emerge dynamically under task constraints (e.g., Haken, Kelso, & Bunz, 1985). These findings have been extended to demonstrate interpersonal interlimb coordination (Schmidt, Bienvenu, Fitzpatrick, & Amazeen, 1998). Additionally, nonlinear analysis of team coordination has shown that teams dynamically coordinate to accomplish a task (Gorman, Amazeen, & Cooke, 2010). The proposed study employs motion capture of hand movements during a cooperative manual task, and motion data will be analyzed using the methods of cross-recurrence quantification (Zbilut, Giuliani, & Webber, 1998). It is hypothesized that data series of dyads completing the task faster will reflect similar system states (e.g., longer and more frequent recurrent states) that are perhaps indicative of interpersonal coupled oscillations.

### **05.17.14 Motivational Effect of Extrinsic Rewards and Social Comparison on Inhibitory Control in Adults with ADHD**

**Tephillah, Jeyaraj-Powell** *University of Central Oklahoma*

**William Scott, Sims** *University of Central Oklahoma*

The current study is an attempt to understand the link between reward processes and behavioral inhibition in adults with ADHD. Studies have shown that motivation is a moderator of inhibitory control in children with ADHD, but little has been done to show the same effect in adults with ADHD. Additionally, social rewards such as praise and positive feedback have been shown to be a moderator of inhibitory control in children with ADHD, though not as strong as tangible rewards. The current study will use false information regarding the performance of other participants as well as monetary rewards as mediators. Failures of inhibition will be measured using a Stop-Signal Task (SST). The study utilizes a 3x2 mixed design, with participants being randomly assigned to one of three conditions: no-reward, low-reward, and high reward. It is expected that participants in the high-reward/feedback condition will exhibit the greatest inhibitory control, and those in the no-feedback/no-reward condition will exhibit the least inhibitory control.

## **05.17.15 The Effects of a Visuospatial Secondary Task on Situation Model Construction During Reading**

**J,Randall** *Cameron University*

**John,Geiger** *Cameron University*

**Sarah,Downen** *Cameron University*

People form several representations during reading. The situation model represents the situation described by the text and contains both information from the text and inferences. Perrig and Kintsch studied the situation models formed while reading, and found that text style affects the type formed. Route texts led to a proposition based model; survey texts lead to a spatial model in females. Males formed a spatial model for both texts. Shah and Miyake demonstrated that working memory consists of 2 different systems: verbal and spatial. Friedman and Miyake found that spatial components of situation models use spatial WM, and the causal components rely on verbal WM. The present study presented route and survey texts while tying up spatial WM with a Visuospatial Tapping task. If all situation model formats contain perceptual components and rely to the same degree on visuospatial WM, then the secondary task should affect all formats equally. If a spatial model requires more resources in WM memory than a linear model, then performance should decline for the survey text more than that route text with the task. 42 participants read route or survey text and 23 participants performed the secondary task. Locative and inference questions were asked about the text. Participants also recalled the text and drew maps of the town. No significant effects or interactions were found for the questions. The recall and map drawings are being analyzed and will be presented at the conference.

## **05.17.16 The Importance of Attention Control: The Bridge of Hope Between Mindfulness and Flourishing**

**Jedediah,Bragg** *University of Oklahoma*

**Kara,Brunk** *University of Oklahoma*

Mental health professionals have long been interested in the benefits of training attention. Our study (N=102) explores the relationship between attention control, mindfulness, and hope. We explored the differences between mindfulness and attention control via exploratory factor analysis and found a significant overlap. Next, we performed a hierarchical regression indicating mindfulness did not account for any unique variance over attention control in the prediction of hope. Because our results suggest that mindfulness is synonymous with greater attention control, we theorized that mindfulness is used to generate hope, resulting in the perception that one is psychologically flourishing. To test these causal relations, we performed a mediation analysis with mindfulness as the exogenous variable leading to hope which leads to flourishing. The test included a bootstrap analysis that indicated the indirect effect was statistically significant. Significance tests indicated that hope as a mediator accounted for 78% of the variance between mindfulness and flourishing. This effect size suggests that hope is a full mediator between mindfulness and flourishing consistent with our proposed causal model. Our results are consistent with mindfulness and higher attention control being identical states. Moreover, our results suggest that attention control is central to hope, consistent with theories suggesting that hopeful people "focus" on positive outcomes.

### **05.17.17 Importance of family support to building hope among a sample of adolescent females**

**Jedediah, Bragg** *University of Oklahoma*

**Kara, Brunk** *University of Oklahoma*

**Vanessa, Brown** *University of Oklahoma*

Hope for a better future is a cognitive set that predicts multiple well-being outcomes such as life satisfaction, self-worth, and meaningfulness of life. Moreover, theory suggests supportive families play an important role in instilling hope within individuals. Yet, to our knowledge no research exists that tests the importance of family support to the development of hope. We tested among adolescent females (N=557) a path model of family support as a causal variable for building hope that leads to greater life satisfaction. The path analysis proved statistically significant, a result consistent with the theory that family support is an important causal variable for building hope. These results have important implications for both individuals and family therapies, as they suggest the perception by individuals that their families provide support is an important causal variable in the development of hope leading to life satisfaction.

### **05.17.18 Effect of Profanity on Perception of Pain in Those Being Bullied**

**Christopher, Stevens** *Southwestern Oklahoma State University*

**Stephen, Burgess** *Southwestern Oklahoma State University*

The National Educational Association estimates that every 7 minutes a child is a victim of bullying and 85% of the time there is no student or adult intervention. One factor that may affect whether someone intervenes is the evaluation of the experienced during bullying. Perception of pain in others is affected by several psychological, behavioral and contextual factors (Sullivan et al., 2006). The communication model of pain proposes that the sender's (the person thought to be experiencing pain), pain behavior, the receiver's sensitivity to features of the senders' behavior and the receiver's attitudes and beliefs may affect the perception of pain in others (Craig, 1998). In the present study we explored differences in perceived pain others between males and females. Participants were 70 primarily Caucasian freshmen college students (mean age = 19.2). Participants completed a series of scenarios designed to portray a variety of bullying types (e.g., cyber, physical, emotional) and severities. The scenarios were extensively piloted to identify those that represented a range of scores on these factors. The scenarios varied by type of bullying (physical or emotional emphasis), gender of person being bullied, and age of the person being bullied. No significant differences in ratings of perceived pain experienced during being bullied based on gender of rater were observed. There were also no significant interactions between gender of rater and t

### **05.17.19 Arguing against yourself: Exploring the relationship between episodic memory and perjury**

**Jordan,Pyle** *University of Central Oklahoma*

**Kelly,Jent** *University of Central Oklahoma*

**Thomas,Hancock** *University of Central Oklahoma*

False memories are the incorporation of new material into memory which modifies what people believe they experienced. This acquisition of new information contaminates the original memory of the event, reconstructing it. False memory research has consistently shown how misinformation presented after an event affects subsequent recall. What is unknown in the literature is how malleable memory is once the participant has already provided a testimony of the event. To this end, this study evaluated the effects of false information given to participants contingent upon their original testimony. Participants were required to watch a video and either give a testimony or answer questions about what they witnessed. After a week delay, participants were provided with information that either confirmed or disconfirmed their original testimony. For each statement participants had to indicate if the statement was accurate or not and provide their confidence for each claim. Participants were likely to accept misinformation presented to them a week later that specifically contradicted their original accurate testimony. Confidence ratings showed that participants overall confidence was less about the new information; however, when given a dichotomous choice (yes, it happened/no, it did not happen) they would still choose the former. This study suggests that false information presented after a period of time still affects the memory of an event.

### **05.17.20 Laser Bees: The Future of Planetary Defense**

**Darion,Releford** *Northeastern State University*

Laser bees are tiny spacecraft designed to deflect asteroids that threaten the earth. They are small and travel in a swarm. Each craft is equipped with a high-powered laser that is used to vaporize part of the asteroid. Laser bees will alter the course of dangerous asteroids causing them to miss the Earth. There are various groups, led by the Planetary Society, working together to develop laser bees. They test the technology and techniques needed to make the swarm efficient.

## **05.17.21 How Fatherly Involvement Relates to Teenage Pregnancy and Perception of Sexual Behaviors**

**Alexis, Schroeder** *Southwestern Oklahoma State University*

**Kristin, Woods** *Southwestern Oklahoma State University*

Lack of father investment or the absence of the father does relate to how early adolescents start to get involved in sexual activities and how early adolescent pregnancies happen (Mendle, Van Hulle, Brooksgunn, Emery, Harden, Turkheimer, D'Onofrio, Rodgers, Lahey, 2009). Today, there are around 820,000 teen pregnancies happening each year, with 80 percent of those unintended (Familyfirstaid, 2015). The purpose of this study was to examine the relationship between fatherly involvement and pregnancies in adolescents. The sample was drawn from the first wave of the U.S. National Longitudinal Study of Adolescent Health (AddHealth), which included adolescents in seventh through twelfth grade. Chi-square analyses and bivariate graphs were used to examine the relationship between adolescent pregnancies and time spent with their father. The results suggest that there is a statistically significant relationship between how involved the father is in the female adolescents' life with how adolescents perceive risky sexual behaviors from an early age. In conclusion, those that had an absent father or a less involved father were more likely to engage in risky sexual behaviors and get pregnant at an early age. The findings of this research coincide with the results of previous research, which taken together suggests that female adolescents with a strong relationship with their biological father are less likely to engage in risky sexual behaviors at an early age.

## **05.17.22 The Relationship between Stress, Sexualization, and Salivary Hormones**

**Ashley, Murray** *University of Toledo*

**Gwendolyn, Burgess** *Southwestern Oklahoma State University*

**Laura, Burleigh** *Southwestern Oklahoma State University*

**Lisa, Appeddu** *Southwestern Oklahoma State University*

**Melinda, Burgess** *Southwestern Oklahoma State University*

**Patra, Kositchaiwat** *Southwestern Oklahoma State University*

The objectives of this study were to investigate the relationship between stress level and salivary hormones after subjects were asked to conduct poses that were either high or low in sexualization and power. This study is part of a larger experiment that followed the published methods of Carney, Cuddy, and Yap (2010) in evaluating cortisol and testosterone levels. Briefly, two sets of salivary samples were collected per subject before and after conducting a physical pose to evaluate whether any change from baseline occurred. A subset of 57 out of the 86 original samples were randomly chosen after stratification by treatment. Samples were stored at -40 degrees Celsius until analyzed in duplicate using Salivary Assay kits (Salimetrics, LLC). Factors that will be reported include: (1) changes in salivary alpha-amylase (as a proposed indirect indicator of adrenergic activity), estrogen, and progesterone levels, if any, (2) relationship of the three previous salivary components with cortisol and testosterone, and (3) their relationship with stress levels as self-reported by subjects. Results obtained from this study will be applied to future research designs which evaluate salivary hormones in test subjects exposed to different stimuli.



### **05.17.23 The Relationship Between Interpersonal Functioning and Anxiety within Adolescent Delinquent Males**

**Gwendolyn,Burgess** *Southwestern Oklahoma State University*

**John,Barnett** *Southwestern Oklahoma State University*

Problem: Various lines of research suggest that juvenile delinquents may experience elevated levels of anxiety, and that this may be associated with decreased levels of interpersonal functioning. This study will focus on the relationship between the interpersonal scale of emotional intelligence and anxiety, for juvenile delinquent males in a residential setting. Method: Participants consisted of 105 juvenile delinquent males between 16 and 18 years of age, within a residential facility. Upon arrival, all residents were administered a battery of assessments including the Multidimensional Anxiety Scale for Children (MASC), and the BarOn Emotional Quotient Inventory- Youth Version (EQ-I:YV), which incorporates the Interpersonal Scale of Emotional Intelligence. Scores were obtained upon arrival to the facility and immediately prior to discharge in order to obtain pre and post assessment scores. A simple linear regression was performed utilizing SPSS 22.0 to explore the relationship between the Interpersonal Scale of emotional intelligence and a total score of anxiety. Results: will lead to an increased understanding of the juvenile delinquent population and may help identify variables that can be targeted for intervention. These interventions may then provide an effective path toward the overall treatment of juvenile delinquency.

### **05.17.24 Gender Differences in the Immediate Perception of Violent Scenarios**

**Adam,Everson** *University of Central Oklahoma*

**Melissa,Baker** *University of Central Oklahoma*

This study investigates how differences in the gender of the aggressor and time given to respond influences immediate judgments of and reactions to viewing a violent situation. When given a generous amount of time to respond to a situation, one may provide a strategic response based on social learning of behavior inhibit, views of traditional gender roles and false re-imaginings of the event. This study, then, investigates the immediate perceptions of a violent situation not influenced by these controlled cognitive processes. Upon viewing videos depicting an actor aggressing toward the camera, participants will be asked to provide an immediate response regarding their aggressive feelings toward the actor. It is expected that male participants will generally rate situations as less violent but will have elevated levels of aggression following the viewing of a violent situation. This aggressive response from males will not be amplified in the face of an aggressor violating normal gender roles (e.g., a woman aggressing physically) as this should be the product of more controlled social processes that would not have time to influence responses given the immediate response deadline. This study hopes to extend the current knowledge on gender-based differences in the perception of and reactions to a violent situation, allowing for a more thorough understanding of how individuals, particularly eyewitnesses, can vary in their understanding of the same violent situation.

### **05.17.25 The Association of Adolescent Drinking Behavior with Relationship to Parents**

**Kristin, Woods** *Southwestern Oklahoma State University*

**Rachel, Yarnell** *Southwestern Oklahoma State University*

**Cynthia, Spering** *Northeastern State University*

**Karie, Cragg** *Northeastern State University*

A major public health problem in the U. S. is alcohol use in those under 21 years of age with 24 percent of youth reporting drinking and 15 percent reporting binge drinking (Centers for Disease Control and Prevention, 2014). Engaging in this risky behavior for underage youth resulted in approximately 189,000 emergency room visits in 2010 and over 4,300 annual deaths. Recent research looked at parents who consume alcohol in front of the adolescent and how that could influence the rest of the adolescent's life (Cranford, Zucker, Jeste, Puttler, & Fitzgerald, 2010). Results found that when a parent drinks alcohol in front of the adolescent then in adulthood the adolescent is more likely to use and abuse alcohol. The purpose of this study was to examine how an adolescents' relationship with their parent relates with drinking behaviors. The sample was drawn from the first wave of the U. S. National Longitudinal Study of Adolescent Health (AddHealth), which included adolescents in seventh through twelfth grade. Chi-square, correlation, and ANOVA analyses were used to examine the data. The results suggest that if the parent is present when the adolescent is consuming alcohol then alcohol consumption is lower and lack of parental presence increases amount and frequency of alcohol. Adolescents' who partake in this risky behavior tend to be in more trouble with their parents. In conclusion, parental involvement in an adolescents' life is associated with

### **05.17.26 Native American college students' personal growth initiative, health, and ethnic identity**

**Alissa, Baker-Oglesbee** *Northeastern State University*

**Amber, Wigington** *Northeastern State University*

The main objective of this study was to explore relationships between personal growth initiative, life-satisfaction, physical and mental health, and ethnic identity in a diverse student population with high numbers of Native Americans. The Personal Growth Initiative Scale-II (PGIS-II; Robitschek et al., 2012) measures an individual's capacity for intentional self-improvement and is associated with many aspects of better functioning. There is limited theory and research on the way many positive psychology constructs function within diverse groups (Robitschek & Spering, 2012). College students were recruited and surveyed for this study. Due to individual group sizes, only the students who identified solely as white/Caucasian (N= 262) or solely as Native American/American Indian (N = 140) were included in these analyses. Results indicate that Native American and white participants did not differ significantly on their overall PGIS-II scores, nor on their PGI subscale scores. Higher PGIS-II scores were related to fewer days of rated "not good" mental health for the Native American group ( $r(136) = -.21, p = .01$ ). In regression analyses, total PGIS-II scores did not predict mental and physical health, but post hoc regressions revealed that several of the PGIS-II subscales were significant predictors for both groups. The findings contribute towards a growing body of research on possible benefits of higher levels of PGI, as well as applicability to diverse groups.

## **05.17.27 Measuring Moral Behavioral Reactions After Autonomic Feedback**

**Dustin,Belden** *University of Central Oklahoma*

Moral dilemmas have been a part of Social psychological research for decades, as have attachment styles and group behavior. Research has also shown that moral decisions have been altered after the experience of cardiovascular feedback, that attachment styles can change later in adulthood, and can even change again due to the type of group a young adult chooses to be a member of. It is the belief of the author that the most accurate moral position can be obtained after a cardiovascular feedback condition, and that cardiovascular activity needs to be analyzed dynamically, in order to understand the outcome difference this method provides over previous research methods. It is hypothesized that the addition of autonomic feedback, even through false feedback, will provide a more accurate understanding of a person's real life moral position. Attachment style questionnaires will be given to understand the person's attachment style, and cardiovascular activity will be analyzed through standard fourier transforms. It is proposed that the pink noise will show greater intention as false feedback is increased. Correlations between dynamic feedback and attachment styles is unknown.

## **05.17.28 Exploration of undergraduate psychology majors' involvement in research: A pilot study**

**Alissa,Baker-Oglesbee** *Northeastern State University*

**Amber,Wigington** *Northeastern State University*

**Cynthia,Spering** *Northeastern State University*

**Elizabeth,Keller-Dupree** *Northeastern State University*

According to guidelines set forth by the American Psychological Association, scientific inquiry and critical thinking skills are critical to the undergraduate psychology major. Students develop these skills in courses on Statistics, Research Methods, and other core courses in their program of study; however, students who participate in additional research and critical thinking projects outside of regular courses are able to further develop those skills. This exploratory pilot study was conducted at a regional teaching university in order to better understand our psychology majors' thoughts, beliefs, and feelings about the research process and the prospect of engaging in research at our institution. It was hypothesized that research-related coursework and plans to apply to research-related graduate programs would be positively correlated to scores on the Research Beliefs Questionnaire (RBQ). Higher scores on the RBQ were associated with having taken Experimental Psychology. A data-driven thematic coding procedure identified that students who were not currently involved in research described two main themes for not participating: a) a lack of time and b) a lack of information/opportunities. Understanding our students' perceptions about research is critical in our ongoing efforts to improve the research presence in our department and our psychology major overall. In this poster, our future plans for amelioration as well as general tips gleaned from this process are discuss

### **05.17.29 Relationships Between Ethnic Identity, Health, and Life-Satisfaction in Native American Students**

**Alissa, Baker-Oglesbee** *Northeastern State University*

**Amber, Wington** *Northeastern State University*

**Cynthia, Spering** *Northeastern State University*

**Karie, Cragg** *Northeastern State University*

The primary objective of this study was to explore relationships between measures of life-satisfaction, health, and ethnic identity in a diverse, semi-rural student population. Preliminary data were collected via an online survey at a mid-sized, semi-rural regional university. Participants were asked to respond to 4 surveys: the PGIS-II (Robitschek et al., 2012), the Multigroup Ethnic Identity Measure (Phinney, 1992), the Satisfaction with Life (SWL) scale (Diener, 1985), and a general demographic survey that includes 3 questions related to general physical and mental health. Participants who identified as Native American were also asked to complete the Native American Acculturation Scale (Garrett & Pichette, 2000). It was hypothesized that ethnic identity would be positively correlated with the variables of satisfaction with life, physical and mental health. Significant results were found in the expected direction and included a significant negative correlation between traditionalism and poor physical health ( $r = -.174, p < .05$ ) for Native American participants. Caucasian participants displayed significant negative correlations between SWL and poor physical health ( $r = -.248, p < .001$ ), poor mental health ( $r = -.387, p < .001$ ), and poor mental and physical health combined ( $r = -.255, p < .001$ ). For Native Americans, only poor mental health was significantly negatively correlated with SWL ( $r = -.258, p < .01$ ). Implications will be discussed.

### **05.17.30 Doing is believing: Increasing student buy-in for introductory statistics**

**Kristin, Woods** *Southwestern Oklahoma State University*

The teaching of statistics is limited by numerous challenges that are not easily overcome with traditional pedagogical approaches. While many statistics courses teach the mathematics or application of methodology, few convey the necessary skills of approaching a scientific problem from a statistical perspective. In this way, the “tools” that students are commonly provided, often do not serve them well given real world challenges or convey the same “rich, complicated context, and decision-making issues present in the experience of real application” (Nolan & Temple Lang, 2009). Using a flipped-classroom approach with online lectures and in-class work on individual projects, students learn introductory statistics by performing original research using real datasets. The learning materials and teaching strategies were designed to be structured enough to allow students to consistently move forward with their research projects, yet broad enough to encourage students to creatively and independently explore their questions by actively driving the decisions involved in inquiry. Students learn how to pose a research question, prepare data for analysis, and answer their question using archival data and SAS. This poster will discuss the pre-post survey results of student interest and knowledge in statistics and pre-post test results from the ARTIST that evaluates statistical literacy, statistical reasoning, and statistical thinking (delMas, Garfield, Ooms, &

## **Abstracts from the 2015 Oklahoma Research Day**

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#### **05. Mathematics and Science**

#### **18. Statistics**

##### **05.18.01 Simulated Learning, Does It Work?**

**Cynthia, Murray** *University of Central Oklahoma*

**Danielle, Perlingiere** *University of Central Oklahoma*

**Jessica, Sanders** *University of Central Oklahoma*

**Seth, Hiddink** *University of Central Oklahoma*

This study compares two groups of UCO nursing students enrolled in the 2013 Medical Surgical Nursing II class. One group (control) was assigned to a traditional clinical rotation at a hospital; the other group (experimental) was assigned to a simulation lab rotation at UCO. All students took the same pre- and post-tests. Differences in scores between pre- and post-tests and between control and experimental groups were determined. In addition, student demographics and a satisfaction survey given to the experimental group were analyzed. Statistical methods included t-test, Fisher's Exact test, analysis of variance, and chi-square test. In the control group, there was a significant difference between pre- and post-test means ( $p=0.0013$ ). A test score of 60 or greater was used to indicate passing. In the experimental group, there was a significant difference between the percent of those passing the post-test with regard to whether they had passed the pre-test ( $p=0.0144$ ). 84% of the survey responses indicated that the simulated lab was effective at providing a safe environment to practice.

## **05.18.02 All About the 3-Point Kick**

**Cynthia,Murray** *University of Central Oklahoma*

**Danielle,Perlingiere** *University of Central Oklahoma*

**Jessica,Sanders** *University of Central Oklahoma*

**Seth,Hiddink** *University of Central Oklahoma*

This study investigates whether there is variability in successful field goal DISTANCES in professional football with regard to the team, quarter (1-4, OT), stadium (indoor/outdoor/both), regular/post season game, home/away game, time (month and year) and the kicker's age and size. In addition, because a team can reduce its reliance on a bad FG kicker, the NUMBER of successful field goals was analyzed. To determine reliability, 5 years (2009-2013) of data was collected (NFL.com) which included 4207 successful field goals by 56 kickers. Statistical methods included t-tests, analysis of variance, goodness-of-fit chi-square tests, Pearson correlation coefficients, and multiple regression. Based on univariate analyses, the longest average distance occurred in stadiums with a retractable roof, regular season games, and in 2012 or 2013. The number of field goals was greatest in the 2nd quarter, outdoor stadiums, and the month of December. The greatest number of field goals (61.6%) was between 20-30 and 30-40 yards. The largest percent of kicks greater than 40 yards (43.4%) occurred in October 2013.

## **05.18.03 Examining the relationship between reporting quality and journal prestige in PTSD Neuroimaging research**

**Anh,Tran-Pham** *Tulsa Community College*

**Branden,Carr** *Oklahoma State University*

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

Reporting quality has received increased attention in recent years due to concerns related to the validity of scientific evidence as well as the proliferation of meta-analysis studies in medicine. To address this issue, standardized reporting frameworks have been adopted for the reporting of randomized controlled trials (e.g.,CONSORT), meta-analyses (e.g., PRISMA, MOOSE), and other research designs. Due to the unique features of neuroimaging studies, current frameworks are not applicable. We recently developed a quality scale to evaluate neuroimaging studies. For the present study, we located 66 neuroimaging studies of post-traumatic stress disorder. These studies were evaluated using the quality scale and assigned a numeric rating. Next, the impact factor - a proxy measure for journal prestige - was retrieved for each journal in which these articles were published. A Pearson correlation coefficient will be used to evaluate the relationship between journal prestige and reporting quality.

#### **05.18.04 The Future of Ghana: A Time Series Analysis and Forecast of Inflation**

**Josephine, Akosa** *Oklahoma State University*

For a very long time, inflation has been one of the intractable problems the Ghanaian economy has faced. Many Ghanaians are generally worried about how future inflation rates would affect the economic growth of the country. This study, based on inflation rates from 1965 to 2013, utilized an ARMA(1,1) model with outlier intervention to forecast inflation rates of Ghana. The results indicated that the highest plausible prediction limit is about 57%, well above the threshold beyond which inflation has adverse effect on the economic growth of the country. As such it is recommended policy makers put in place measures to deal with the rise of inflation in the country.

#### **05.18.05 Methods to Improve Accuracy of Predicting Traffic Fatalities in Oklahoma**

**Jessica, Sanders** *University of Central Oklahoma*

**Nela, Mrchkovska** *University of Central Oklahoma*

**Tracy, Morris** *University of Central Oklahoma*

The Oklahoma Highway Safety Office (OHSO) is a state agency that keeps records of vehicle accidents in Oklahoma. The OHSO uses this information to help other state agencies, like the Oklahoma Department of Transportation and the Oklahoma Highway Patrol, to develop programs to address highway safety issues. The OHSO must also make future projections for the number of traffic fatalities and report this information to the National Highway Traffic Safety Administration. Currently, students and faculty at the University of Central Oklahoma (UCO) analyze data provided by the OHSO to determine trends in the number of traffic fatalities over time and to make projections for the future. The goal of this project is to find the best method that could be used to improve the accuracy of projections of the number of traffic fatalities in Oklahoma. Data on the number of traffic fatalities from 1937 to 2007 were used to develop models for predicting the number of traffic fatalities in the future. Four modeling methods were used: Moving Averages, ARIMA, ARIMA with additional variable unemployment, and Exponential Smoothing. The models were then used to predict the number of traffic fatalities for 2008 to 2012. These predictions were then compared to the actual data values for these years. The mean square error of the predicted values to the actual values was used to select the best fitting model.

## **05.18.06 A Statistical Analysis of the Last 78 Years of the Heisman Trophy**

**Jessica, Sanders** *University of Central Oklahoma*

**Tracy, Morris** *University of Central Oklahoma*

The Heisman Trophy is given annually to the best U.S. college football player regardless of position. Sports journalists from around the country and previous Heisman winners cast ballots with a list of the voter's top three choices in order. Each first place vote receives three points, second place votes receive two points, and third place votes receive one point. The player with the most points is named the winner and presented with the Heisman Trophy at a ceremony in December of each year. There is some controversy surrounding the selection of Heisman Trophy winners. Specifically, critics have speculated the presence of selection bias with respect to region, position, conference, and school, arguing that the best player is not necessarily selected each year. This research investigated the presence or absence of this bias through statistical analysis. Data concerning 755 players, including nominees and winners from 1935 to 2013, were collected from [www.sports-reference.com](http://www.sports-reference.com). Variables related to player ability as well as variables concerning school, geographic location, and other demographics were examined to determine what variables are significantly related to winning the trophy. A logistic regression model was developed to predict the winner of the Heisman Trophy. This model was then used to predict the winner of the 2014 Trophy.



**05.18.07 Statistical Ideas: Strength of Masseter and Temporalis Muscles in Deer Mice from Various Regions in Oklahoma**

**Alexis,Steinhart** *University of Central Oklahoma*

**Beitriz,Granda Vega** *University of Central Oklahoma*

**Breanna,Smith** *University of Central Oklahoma*

**Christina,Evans** *University of Central Oklahoma*

**Christopher,Chan** *University of Central Oklahoma*

**Erin,Healey** *University of Central Oklahoma*

**Erinn,Murphy** *University of Central Oklahoma*

**Joan,Brenneman** *University of Central Oklahoma*

**Jordan,Gooch** *University of Central Oklahoma*

**Julia,Garrett** *University of Central Oklahoma*

**Kristey,Meyer** *University of Central Oklahoma*

**Meghan,Carr** *University of Central Oklahoma*

**Mekale,Chapple** *University of Central Oklahoma*

**Tamatha,Perkins** *University of Central Oklahoma*

**William,Caire** *University of Central Oklahoma*

**Zhi,Lin** *University of Central Oklahoma*

A data set was provided by Dr. Caire which contained measurements taken from deer mice (*Peromyscus maniculatus*) stored in a natural history museum. The mice that were measured were selected because they had complete skulls. All of the measurements in this experiment are from deer mice in Oklahoma. This report analyzed adult (3 years old) deer mice exclusively. We used the One-Way ANOVA test to determine if the regions where the mice are subjected to harder dietary fare (far Western and Eastern Oklahoma) produce mice with a significantly higher mechanical advantage than those regions where the food sources are softer. We also used a Two-Sample T-test to determine whether or not a difference exists in the mechanical advantage of the male and female deer mouse.

## **05.18.08 A Study of the Most Vulnerable**

**Cynthia, Murray** *University of Central Oklahoma*

**Jennifer, Holmes** *University of Central Oklahoma*

**Seth, Hiddink** *University of Central Oklahoma*

This study examines hospital discharges in Oklahoma for a disease prevalent in the elderly, stroke, and one common in children, asthma. The Oklahoma State Department of Health provided data for 2010 – 2012. Their research questions for stroke patients included discharge destination with regard to type of insurance, county of residence, and procedures during hospitalization. Research questions for childhood asthma included a trend analysis of hospitalization rates and costs with regard to air quality. In addition, yearly distributions for age, race, and sex were determined for both diagnoses. For stroke patients, survival distributions by race were compared as well as mortality rates for Oklahoma counties which were categorized into 5 regions. For the hospitalization and cost analysis involving asthma patients, Oklahoma counties in which ozone (15 sites, 9 counties) and fine particulate matter (8 sites, 5 counties) are measured were dichotomized into good and poor. SPSS was used for graphs and statistical tests. U.S. census data from 2010 was used to adjust rates for population in OK counties.

## **05.18.09 A Comparison of Statistical Methods for Phenotype Prediction From Genotype Data**

**Lan, Zhu** *Oklahoma State University*

**Xiaowei, Hu** *Oklahoma State University*

Predicting phenotypes from genotype data is important for human health, medicine, animal and plant breeding, and evolutionary biology. Recently, it has also been applied to forensics science. To help researchers select an appropriate prediction model for their own data analysis, in this study, we offer a comparison of three popular statistical methodologies in the field of predicting phenotype from genotype data. Specifically, we compare Genomic Best Linear Unbiased Prediction (GBLUP) (Ober et al 2012), BayesB Model (Gianola et al 2011), and Neural Networks (Chang and McGeachie 2011). Each methodology performs well if all its assumptions are satisfied. However, some assumptions are often violated in reality. Therefore, no one statistical method outperforms others for all types of data. Besides assumptions, factors that affect the performance of prediction include but are not limited to sample size, available informative biomarkers, nature of phenotypes, etc. In this study, we compare above three methods and evaluate the performance of prediction by exploring different levels of sample size and various distributions of phenotypes, with the goal of providing a useful guideline for researchers to wisely select a suitable model that fits their research needs.

## **05.18.10 A Statistical Analysis of the Deterioration of Cartridge Cases**

**Amanda, Gibson** *University of Central Oklahoma*

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

**Deion, Christophe** *University of Central Oklahoma*

**Mary, Bayles** *University of Central Oklahoma*

**Tracy, Morris** *University of Central Oklahoma*

Project SCHOLAR (Student Consulting Help for Organizational Leaders and Academic Researchers) is a statistical consulting service composed of undergraduate students at the University of Central Oklahoma (UCO). Faculty from the Department of Mathematics and Statistics oversee the work of the SCHOLAR students on projects submitted by other researchers. A graduate student from the Forensic Science Institute at UCO conducted an experiment concerning the matching of cartridge cases. In this study, 1,296 cartridge cases were collected. These cartridge cases were placed in six different locations and over the course of a year, 18 cartridge cases were collected from each location every 30 days for analysis. The cartridge cases were then matched to a set of control cases. Those greatly deteriorated cartridge cases that were unable to be matched then underwent one of three cleaning techniques to determine which technique had the best capability of restoring the cartridge cases' original features. The SCHOLAR students analyzed the data resulting from this experiment. Specifically, two questions were addressed: (1) what factors, including time, rainfall, temperature, humidity, composition, and gun, are significantly related to whether or not a cartridge case can be matched, and (2) which cleaning technique, if any, should be used depending on the composition of the cartridge case and in which location it was found.

## **05.18.11 The Use of Clinical Trial Registries for Meta-Analyses and Systematic Reviews of Select Neurological Journals**

**Branden,Carr** *Oklahoma State University*

**Gregory,Cook** *Oklahoma State University*

**Haie,Mucklerath** *Oklahoma State University*

**Laura,Varney** *Oklahoma State University*

**Matt,Weiher** *Oklahoma State University*

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

**Phillip,Sinnett** *Oklahoma State University*

Background: Systematic reviews (SRs) synthesize existing research findings in order to better inform medical decision making. Inherent to SR methodology is publication bias, or the notion that statistically-significant published studies are more commonly included in SRs than unpublished studies. Because of this, the resulting effect sizes from SRs may be misleading. Researchers have handled publication bias in numerous ways, and clinical trials registries have recently been discussed as a possibility for obtaining unpublished data. Very little is known about their use in SR searches, however. Objectives: To examine the use of clinical trials registries in published SRs from the neuroscience literature. Methods: A six-year review (2008-2014) of 6 neuroscience journals (American Neurological Association, Annals of Neurology, Brain, Lancet Neurology, Neurology, and The Neuroscientist) was performed to identify eligible SRs. Journals were selected based on their high impact factors. A previously published PubMed search strategy was used to initially identify eligible studies. All SRs comprising the final sample were independently reviewed to determine if clinical trials registries had been included as part of the search process. Results: Descriptive statistics will be used for analysis of study data. Conclusions: Researchers conducting SRs should search clinical trials registries to locate additional sources for unpublished data.

## **Abstracts from the 2015 Oklahoma Research Day**

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#### **05. Mathematics and Science**

#### **19. Zoology**

##### **05.19.01 Nest structure and placement of Orchard oriole (*Icterus spurius*) nests in tallgrass prairie**

**Alan,Stie** *Tulsa Community College*

**Bryan,Coppedge** *Tulsa Community College*

We studied the structure and placement of Orchard oriole (*Icterus spurius*) nests in upland tallgrass prairie at the Tallgrass Prairie Preserve in Osage County, Oklahoma. Nests were generally located in woody thickets of sumac, plum, or buttonbush near water at heights varying from 111 to 205cm. Nest mass (gm) after drying decreased with placement height. The average length of randomly extracted fibers from nests varied from 8.6 to over 21cm. Larger nests contained longer fibers, indicating that orioles use longer fibers when building at lower locations with more attachment points to build larger nests.

##### **05.19.02 Do Tail Displays by Juvenile Collared Lizards Function to Distract Prey?**

**Cody,Braun** *University of Central Oklahoma*

**Troy,Baird** *University of Central Oklahoma*

Sit-and-wait predators use stealth to approach their prey close enough to strike. Some snakes give conspicuous tail displays that divert the attention of prey away from the predator's head. Our preliminary field observations on foraging collared lizards suggested that they may give tail displays when stalking arthropod prey. We conducted field trials involving introduction of tethered grasshoppers to free-ranging juvenile collared lizards to test the hypothesis that tail displays function to distract prey. Juvenile collared lizards performed two types of tail displays while stalking prey. Curl displays involved holding the tail in a stiff arch with the distal end pointed anteriorly. Sinusoidal displays involved deliberate lateral undulation as the tail was raised. Lizards performed tail displays more frequently, and for a greater proportion of trials when they were stalking prey than when not stalking prey. Moreover, the proportion of time spent displaying before their first strikes on tethered prey was twice that after the element of surprise was lost following the first strike. Our results support the hypothesis that tail displays given while stalking distract prey allowing juvenile collared lizards to approach more closely before striking. To our knowledge, our data are the first evidence that lizards give displays that function to distract their prey.

### **05.19.03 Skull Morphometrics as an indicator of Bite Performance in Testudines**

**Jennifer, Mattson** *East Central University*

**Kenneth, Andrews** *East Central University*

From an evolutionary perspective, differences in bite performance of turtles has been observed and is generally correlated with body size. Empirical findings show that bite force changes in proportion to the lengths of the carapace and also the size of the skull including the structure of the jaw. Variables such as head height have been found to be associated with increased bite force. To test these hypotheses, measurements were taken of nine species of turtles and compared with previous data. The species examined are: *Chelydra serpentina*, *Chrysemys picta*, *Graptemys kohni*, *Graptemys p. oachitensis*, *Kinosternon flavescens*, *Kinosternon subrubrum*, *Sternotherus carinatus*, *Sternotherus odoratus*, and *Trachemys scripta elegans*. Measurements were taken (using calipers) of the carapace length, carapace width, head length, head width, head height, and lower jaw length. These measurements were recorded in millimeters on a data spreadsheet. Graphs of each measurement were then created within each species and observed for consistent patterns on each graph. With the exception of hatchlings, results are consistent with the previous data (Herrel, et al., 2002) and support the initial hypothesis that bite performance in certain species of turtles has changed to allow consumption of different food groups. Future studies should exclude the data from hatchlings or perhaps isolate them into their own graph as their measurements tend to obscure the data from the larger specimens measurements.

### **05.19.04 Flamingos and Climate Change: A Tale of Two Species**

**Austin, Jones** *University of Central Oklahoma*

**Chris, Butler** *University of Central Oklahoma*

**Huyen, Tran** *University of Central Oklahoma*

**Jerimiah, Bigger** *University of Central Oklahoma*

From 1850 to 2010 the average temperature globally rose by approximately 1°C. This change in temperature has modified the distribution, phenology and interactions of numerous organisms. However, the potential effects of climate change on many species are not well understood. For example, there have been no studies about how climate change may affect the distribution of flamingoes. For our project, we investigated how climate change may affect the distribution of American Flamingoes (*Phoenicopterus ruber*) and Chilean Flamingoes (*P. chilensis*). American Flamingoes breed in the Caribbean and northern South America. Chilean Flamingoes breed near the central Pacific coast of South America. We downloaded location data for these two species from ORNIS and eBird. We then used Maxent models to analyze at their current distribution and to determine which ecogeographical variables affected their range. The Maxent models showed good agreement with the current ranges of the Chilean and American Flamingoes. Under the various climate change scenarios examined, American Flamingoes were forecast to expand north into Florida by the 2070s. In contrast, a slight decline in the extent of the range of the Chilean Flamingo is predicted. These models show that tropical species may vary in their response to climate change.

#### **05.19.05 Variation in the Vascular Canals of the Testudine Carapace in Relation to Scute Nutrient Requirements.**

**Catherine, Phipps** *East Central University*

**Kenneth, Andrews** *East Central University*

The scutes are plates of keratinous material that are an outer cover of the carapace of a testudine and are continuously growing and regenerating to provide protection. Since scutes lack vascularization, there is little known of the origin of nutrients required to subsidize their growth. It is assumed that the vascular canals of the carapace provide these nutrients to the scutes. The purpose of this study was to analyze the carapacial ultrastructure of testudines to quantitatively determine vascular canal numbers on the surface of the carapace. An increase in the vascular canals would theoretically increase supply of oxygen and nutrients to the outer scute layer for growth. Using imaging software (Photoshop), area analyses were conducted on scanning electron microscopy images of carapacial tissue to determine the ratio of solid bone to vascular canals. These ratios were then analyzed with emphasis on their respective species habitats to allow for a comparison among different species. The overall ratios of the canals were not only different among and between species but the individual sizes of the canals varied greatly between different taxa. There was a direct correlation between the aquatic tendencies of the species and the number of the vascular canals. More "primitive" species possessed larger and less well defined canals compared to more "modern" species.

#### **05.19.06 The effects of climate change on Arctic and Antarctic Terns**

**Chloe, Baird** *University of Central Oklahoma*

**Chris, Butler** *University of Central Oklahoma*

Since the early 20th century, the global temperature has risen 0.8°C. During the same time period, Alaska and Western Canada have warmed by 3-4°C. This is resulted in changes in community composition and distribution in the Arctic. However, temperatures in the Antarctic have only risen by approximately 1.4 °C. This suggests that climate change may affect arctic and Antarctic species at different rates. For this study, we examined the potential change in distribution of the Arctic (*Sterna paradisaea*) and Antarctic (*S. vittata*) Terns. We downloaded location data from Maxent and eBird and current bioclimatic variables from Worldclim. We then created Maxent models to examine the current distribution of these two species. We found that Antarctic Terns were only moderately affected by climate change, with a slight reduction in their range. In contrast, we found that the distribution of the Arctic Tern showed a substantial decrease. We suggest that the effects of climate change during the 21st century will be more pronounced in the Arctic than in the Antarctic.

**05.19.07 Aggressive behavior between forager nestmates and non-nestmates of the sweat bee *Halictus scabiosae* (Rossie) in Turkey (Hymenoptera: Halictidae)**

**Ibrahim, A. Akmak** *Uludag University*

**John, Barthell** *University of Central Oklahoma*

**John, Hranitz** *Bloomsburg University*

**Montserrat, Plascencia** *University of California, Santa Cruz*

**Onur, Girisgin** *Uludag University*

**Ry, Patton** *University of Kansas*

**Victor, Gonzalez** *University of Kansas*

Bees of the family Halictidae, commonly known as sweat bees, are unique because of their plastic social behavior. Even within the same population, females in some nests are entirely solitary while in others they live in groups and are completely social. Additionally, depending on the region and development of the colony, movement of foragers among nests are also possible. We studied behavioral interactions between forager nestmates and non-nestmates of the sweat bee *Halictus scabiosae* (Rossie), a common species in the campus of the Uludag University in Bursa, Turkey. We experimentally paired social females from the same nest ( $n = 8$  trials) and females from different nests ( $n = 9$  trials) within a circle-tube and video recorded their behavior in the dark. We recorded the frequency of 10 behavioral patterns during 20 min per trial ( $n = 5.3$  hours total). Aggressive behaviors were significantly more common between nestmates than between non-nestmates. However, cooperative and avoidance behaviors were significantly higher between non-nestmates than between nest-mates. Our behavioral observations support recent molecular studies in other European populations of *H. scabiosae* that show that nest switches among foragers are common and suggest that nests of this species in Turkey may also include a mixture of related and unrelated workers.

**05.19.08 Effects of Large-Scale Fire on Nesting of Scissor-tailed Flycatchers in the Wichita Mountains**

**Diane, Landoll** *University of Oklahoma*

**Hannah, Richards** *Cameron University*

**Michael, Husak** *Cameron University*

Scissor-tailed Flycatchers are conspicuous Nearctic-Neotropical migratory birds of the southern Great Plains. Often considered savannah specialists, they nest in a variety of open habitats. We searched for nesting Scissor-tailed Flycatchers at the Wichita Mountains Wildlife Refuge in Comanche County, Oklahoma from April through July during the years of 2008 - 2014. All nests had their location recorded with a handheld GPS, and were checked every 2-3 days to monitor their status. In 2011, fires burned a significant portion of both grasslands and oak woodlands on the refuge. We used ArcGIS to compare the abundance, distribution, and density of Scissor-tailed Flycatchers before and after these fires. Scissor-tailed Flycatchers expanded their distribution and increased abundance and density in years after wide-spread fires. Increases are likely due to a decrease in tree density in woodlands and a decrease in grass/forb height in grasslands. Frequency of nest success also increased after fires, likely due to a decrease in predator cover and a decrease in predator abundance.



## **05.19.09 A Statistical Study of Deer Density in Sequoyah State Park, OK From 1989 Through the Present**

**Andrew,Rutter** *Northeastern State University*

**Erik,Terdal** *Northeastern State University*

**Joseph,Cameron** *Northeastern State University*

Monitoring and controlling deer density is important for maintaining healthy herds. Sequoyah State Park in Cherokee county, OK, houses a nature center which monitors the habitat of 10 km<sup>2</sup> of wildlife, including a white-tailed deer (*Odocoileus virginianus*) population at or above carrying capacity. The park has been monitoring deer density using bi-annual 'deer drives' with Northeastern State University from 1989 through the present. These 'deer drives' have allowed park biologists to reduce parasitic diseases and tick population through relocation and controlled harvest of the white-tailed deer. Until now, these decisions have been based on the raw data, which demonstrates that the herd density is decreasing at 0.75 deer/km<sup>2</sup> each year. We aim to determine the major factors attributed to predicting fall white-tailed deer density. We hypothesize that the fall density indicates the parks' carrying capacity and is dependent upon fawn recruitment to the herd. Further, through analysis of the factors that affect fawn recruitment, we will be able to account for a significant amount of the variation in herd density each year. This will be accomplished using statistical inquiry to analyze the effects of both county and park hunting harvest, the Palmer Drought Severity Index (PDSI), lake elevation/flooding, area of controlled burns, number of park visitors, and disease prevalence among harvested deer.

## **05.19.10 Indigenous Peoples and Bees**

**Chet,Bhatta** *University of Kansas*

**Stephanie,Greer** *University of Kansas*

**Victor,Gonzalez** *Other Institution*

Besides being the most important pollinators of wild and cultivated plants, bees are also deeply ingrained in the cultural history of many societies. Archaeological and anthropological records indicate that bees were, and remain, an integral part of the traditional knowledge of many indigenous peoples around the world, including that of ancient civilizations such as the Egyptian and Maya. Here we summarize the ethnobiological studies on native bees worldwide. The information available on the nomenclature, classification, and use of native bees demonstrate the importance of incorporating traditional or indigenous knowledge in scientific studies of bee diversity.

## Participants in the 2015 Oklahoma Research Day

### Held at Northeastern State University

**Abbott, Matt** *Southwestern Oklahoma State University*

05.03.81

**Abernathy, Jasmene** *Langston University*

05.04.04

**Abia, Jude** *Northeastern State University*

05.05.09

05.05.41

**Abraham, K.J.** *Langston University*

05.03.99

**Adelusi, Taiwo** *Cameron University*

05.05.37

**Adenuga, Demilade** *Cameron University*

05.06.34

**Adney, Amanda** *Southwestern Oklahoma State University*

05.08.37

**Aguilar, Don** *Cameron University*

03.04.03

**Ahlander, Joseph** *Northeastern State University*

05.03.100

05.11.04

**Ahmad, Taj** *Cameron University*

05.05.37

**Ahrens, John** *University of Central Oklahoma*

02.06.01

05.12.01

**Aiken, Joseph** *Oklahoma State University*

05.08.31

**Ajisafe, Funke** *Cameron University*

01.06.09

**Akinlawon, Akinola** *Cameron University*

05.06.06

05.13.03

**Akosa, Josephine** *Oklahoma State University*

05.18.04

**Al Moutaa, Mohamed** *University of Central Oklahoma*

01.05.08

**Albahadily, F.** *University of Central Oklahoma*

05.03.11

05.05.11

05.05.13

05.05.14

**Albinescu, Dragos** *Northeastern State University*

05.05.22

**Albrightson, Cindi** *Southwestern Oklahoma State University*

05.08.37

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

01.02.05

**Alhaddad, Mustafa** *University of Central Oklahoma*

05.08.21

**Alharpi,Muna** *University of Tulsa*  
05.03.113

**Aliwali,Joseph** *University of Central Oklahoma*  
05.08.43

**Allen,Connor** *Northeastern State University*  
05.13.18

**,Jennie** *University of Central Oklahoma*  
05.08.14  
05.08.41

**Almeida,Matheus** *University of Central Oklahoma*  
02.03.06  
05.03.41

**AlRashdan,Hamzah** *University of Central Oklahoma*  
05.08.07

**Alrifai,Rad** *Northeastern State University*  
05.06.25  
05.06.26  
05.06.27  
05.06.28  
05.06.29

**Alshareef,Safa** *Southwestern Oklahoma State University*  
02.01.19

**Alsharif,Lama** *Southwestern Oklahoma State University*  
02.01.19

**Alsultan,Ahmed** *University of Central Oklahoma*  
05.08.43

**Alsultan,Ali** *University of Central Oklahoma*  
05.08.43

**Altom-Deckard,Shannon** *Northeastern State University*  
02.01.25

**Alworden,Jacqueline** *Northeastern State University*  
04.01.11

**Anderson,Austin** *Northwestern State University*  
05.05.36

**Anderson,Cory** *University of Central Oklahoma*  
05.05.19  
05.08.18

**Anderson,Steven** *University of Tulsa*  
05.06.22

**Andrews,Kenneth** *East Central University*  
05.19.03  
05.19.05

**Anton,Vanessa** *Northeastern State University*  
02.05.12

**Apon,Amy** *Clemson University*  
05.06.17

**Appeddu,Lisa** *Southwestern Oklahoma State University*  
05.17.22

**Aracena,Jimena** *Southwestern Oklahoma State University*  
05.03.55

**Argyros,Ioannis** *Cameron University*  
05.06.06  
05.13.03

**Armstrong,Grant** *University of Central Oklahoma*  
05.08.42

**Arnold,Barbara** *University of Central Oklahoma*  
05.03.75

**Arnold,Darron** *University of Central Oklahoma*  
01.06.03

**Aronson,Carl** *Northeastern State University*  
05.05.07  
05.05.08

**Arroyo,Lisangela** *Cameron University*  
04.04.03

**Aryal,Aastha** *Cameron University*  
01.04.05  
01.04.09  
01.04.11

**Asaro,Laura** *East Central University*  
05.05.39  
05.06.05

**Atcity,LaTasha** *Northeastern State University*  
04.01.16

**Atkins,Miko** *Northeastern State University*  
05.03.26

**Austion,Kenneth** *Cameron University*  
03.04.03  
03.04.09

**Autry,Tyler** *Oklahoma State University*  
05.08.26

## B

**Baalman,Rachael** *University of Central Oklahoma*  
05.03.04

**Badhan,Faria** *University of Central Oklahoma*  
01.07.12

**Bahavar,Cody** *University of Central Oklahoma*  
05.08.01  
05.08.02  
05.08.22

**Baird,Chloe** *University of Central Oklahoma*  
05.19.06

**Baird,Troy** *University of Central Oklahoma*  
05.03.11  
05.03.21  
05.19.02

**Baker,Melissa** *University of Central Oklahoma*  
02.01.07  
05.17.24

**Baker-Oglesbee,Alissa** *Northeastern State University*  
05.17.26  
05.17.28  
05.17.29

**Balch,Brenden** *University of Central Oklahoma*  
05.13.10

**Baldrige,Blair** *Oklahoma State University*  
05.08.35

**Banerjee,Gaurango** *LINDENWOOD University*  
01.04.02

**Banjara, Mahesh** *University of Central Oklahoma*  
05.08.16  
05.08.21

**Bannish, Brittany** *University of Central Oklahoma*  
05.03.23  
05.13.12

**Bannon, Roger** *Cameron University*  
01.04.07  
01.04.08

**Baptista, Rachel** *University of Tulsa*  
05.12.02

**Barger Johnson, Jennifer** *University of Central Oklahoma*  
01.02.02

**Barnes, Mikasa** *University of Central Oklahoma*  
05.08.28

**Barnett, Amy** *Southwestern Oklahoma State University*  
02.06.02

**Barnett, John** *Southwestern Oklahoma State University*  
05.17.23

**Barrera-Medina, Angelia** *University of Central Oklahoma*  
01.07.02  
01.07.03

**Barros, Julie** *University of Central Oklahoma*  
02.03.06

**Barros, Maine** *University of Central Oklahoma*  
05.03.41

**Bartel, Drew** *Northwestern State University*  
02.04.12

**Barthell, John** *University of Central Oklahoma*  
05.03.101  
05.03.117  
05.03.60  
05.19.07

**Basden, Martine** *Northeastern State University*  
02.01.21

**Bass, David** *University of Central Oklahoma*  
05.03.03

**Bates, Eric** *Tulsa Community College*  
05.09.10

**Baughner, Madeline** *Southwestern Oklahoma State University*  
05.08.37

**Bayles, Mary** *University of Central Oklahoma*  
05.18.10

**Beach, Gleny** *Southeastern Oklahoma State University*  
03.01.03

**Beadle, Cory** *University of Central Oklahoma*  
05.06.32

**Behar, Amanda** *Oklahoma State University*  
05.03.29

**Belden, Dustin** *University of Central Oklahoma*  
05.17.27

**Belflower, Lauren** *University of Central Oklahoma*  
02.01.10

**Bell, Jermaine** *Northwestern State University*  
02.04.06

**Bell, Kathy** *Tulsa Police Department*  
04.09.01

**Bender, Dawn** *Northeastern State University*  
05.03.88

**Bennett, Olivia** *University of Central Oklahoma*  
05.13.11

**Benson, Susan** *University of Central Oklahoma*  
02.01.17

**Benton, Matthew** *University of Central Oklahoma*  
05.08.12

**Bertram, Dr. Glee** *University of Central Oklahoma*  
02.02.03

**Bhargava, Kanika** *University of Central Oklahoma*  
02.01.04  
02.03.06  
02.03.09  
05.03.41  
05.09.08

**Bhatta, Chet** *University of Kansas*  
05.19.10

**Bidjanga, Isabelle** *University of Central Oklahoma*  
04.09.03

**Bidlack, James** *University of Central Oklahoma*  
05.03.39  
05.03.52  
05.03.53  
05.03.54  
05.03.56

**Bigger, Jeremiah** *University of Central Oklahoma*  
05.19.04

**Binnings, Corrine** *Cameron University*  
05.09.05

**Birch, Kaitlynn** *Cameron University*  
03.04.10

**Bisht, Rahul** *Cameron University*  
01.04.06  
01.04.09  
01.04.11  
01.06.05

**Black, Jessica** *Southeastern Oklahoma State University*  
03.06.03

**Blackburn, Abe** *Southeastern Oklahoma State University*  
05.05.04

**Bleichner, Jeffrey** *Tulsa Community College*  
05.09.10

**Bliss, Kristen** *University of Central Oklahoma*  
05.03.112

**Boland, Matthew** *University of Central Oklahoma*  
05.06.32

**Bolejack, Mikaela** *Northeastern State University*  
05.14.06

**Bollig, Pamela** *University of Central Oklahoma*  
02.01.10

**Bond, Daniel** *University of Central Oklahoma*  
05.03.19

**Bonea, Ashley** *Northeastern State University*  
05.11.03

**Bonilla, Maria** *Southeastern Oklahoma State University*  
05.11.01

**Boominathan, Sooraj** *Oklahoma School of Science and Mathematics*  
05.05.32

**Boston, Colten** *Northeastern State University*  
05.06.25

**Bourne, Hannah** *Southeastern Oklahoma State University*  
05.11.01

**Bowen, John** *University of Central Oklahoma*  
05.03.11  
05.05.10  
05.05.11  
05.05.13  
05.05.14

**Boyd, Clayton** *Northeastern State University*  
05.14.01

**Bragg, Jedediah** *University of Oklahoma*  
05.17.16  
05.17.17

**Braly, Adam** *University of Central Oklahoma*  
05.17.13

**Braun, Cody** *University of Central Oklahoma*  
05.19.02

**Brennan, Robert** *University of Central Oklahoma*  
05.03.06  
05.03.110  
05.03.14  
05.03.43  
05.05.13

**Brenneman, Joan** *University of Central Oklahoma*  
05.18.07

**Bressler, Martin** *Southeastern Oklahoma State University*  
01.06.02  
01.06.04

**Brewer, Amelia** *University of Central Oklahoma*  
05.17.05

**Brewer, William** *Northeastern State University*  
05.05.08

**Briscoe, Thomas** *University of Central Oklahoma*  
05.05.11

**Brooks, Erin** *H.S. Homeschool*  
05.05.11

**Brown, Dan** *Southwestern Oklahoma State University*  
04.08.03

**Brown, James** *Northeastern State University*  
05.03.44

**Brown, Kathryn** *Northeastern State University*  
02.01.03

**Brown, Vanessa** *University of Oklahoma*  
05.17.17

**Brue, Krystal** *Cameron University*  
01.06.08

**Brunk, Kara** *University of Oklahoma*  
05.17.16  
05.17.17  
**Brym, Michelle** *University of Central Oklahoma*  
04.05.01  
**Bryson, Matthew** *University of Central Oklahoma*  
05.03.43  
**Buckholtz, Jody** *Northeastern State University*  
05.05.29  
**Burdina, Mariya** *University of Central Oklahoma*  
01.03.06  
**Burdine, Jake** *University of Central Oklahoma*  
05.06.32  
05.13.16  
**Burgess, Gwendolyn** *Southwestern Oklahoma State University*  
05.17.22  
05.17.23  
**Barnett, Melinda** *Southwestern Oklahoma State University*  
05.17.22  
**Anderson, Stephen** *Southwestern Oklahoma State University*  
05.17.18  
**Burke, Bradly** *Southwestern Oklahoma State University*  
05.03.92  
**Burleigh, Laura** *Southwestern Oklahoma State University*  
05.17.22  
**Burnett, Kaitlyn** *University of Central Oklahoma*  
02.03.02  
**Burr, Dr. Brandon** *University of Central Oklahoma*  
02.02.03  
**Burton, Austin** *University of Central Oklahoma*  
03.05.02  
**Bush, Kenneth** *University of Central Oklahoma*  
05.08.33  
**Buss, Audrey** *Northwestern State University*  
02.04.07  
**Butler, Chris** *University of Central Oklahoma*  
05.03.51  
05.03.57  
05.19.04  
05.19.06  
**Butterworth, Joanna** *University of Central Oklahoma*  
04.07.03

C

**Caffee, Cheryl** *University of Central Oklahoma*  
04.07.05  
**Caire, William** *University of Central Oklahoma*  
05.18.07  
**Çakmak, Ibrahim** *Uludag University*  
05.19.07  
**Cambiano, Renee** *Northeastern State University*  
02.01.01  
**Cameron, Joseph** *Northeastern State University*  
05.03.86  
05.19.09



**Carr,Branden** *Oklahoma State University*  
05.18.03  
05.18.11  
**Carr,Meghan** *University of Central Oklahoma*  
05.18.07  
**Carson,Rhonda** *University of Central Oklahoma*  
05.03.59  
05.03.60  
05.03.61  
05.03.62  
**Caruso,John** *University of Tulsa*  
05.12.02  
**Castle,Lisa** *Southwestern Oklahoma State University*  
05.04.03  
**Cavazos,Jenel** *Cameron University*  
05.17.03  
**Cevera,Kyle** *University of Central Oklahoma*  
01.02.05  
**Chambers,Steven** *University of Central Oklahoma*  
05.06.07  
**Chan,Christopher** *University of Central Oklahoma*  
05.18.07  
**Chang,Jennifer** *Northeastern State University*  
05.14.05  
**Chanslor,Martyne** *Northeastern State University*  
04.04.01  
**Chaple,Alan** *University of Central Oklahoma*  
04.07.16  
**Chapman,Tye** *University of Central Oklahoma*  
05.05.10  
**Chapple,Mekale** *University of Central Oklahoma*  
05.18.07  
**Chatman,David** *Cameron University*  
03.04.03  
03.04.10  
03.04.11  
**Chaudhary,Jayant** *Cameron University*  
01.06.05  
**Chavez,Karina** *East Central University*  
05.13.01  
**Cheek,Justin** *University of Central Oklahoma*  
05.03.76  
**Chen,Allen** *Oklahoma School of Science and Mathematics*  
05.05.26  
05.05.34  
**Chen,Chuanwei** *University of Central Oklahoma*  
05.06.20  
**Chen,Han-Sheng** *Southeastern Oklahoma State University*  
01.04.04  
**Chen,Wei** *University of Central Oklahoma*  
05.08.01  
05.08.02  
05.08.22  
**Chen,Xi** *University of Central Oklahoma*  
02.03.09

**Cheng, Jessica** *Northeastern State University*  
05.05.25

**Cheng, Qi** *Oklahoma State University*  
05.08.38  
05.08.39

**Chin, Jane** *Oklahoma School of Science and Mathematics*  
05.05.32

**Chisam, Juliette** *Edmond North HS*  
05.05.11

**Chishti, Faez** *University of Central Oklahoma*  
05.06.14

**Chooback, lillian** *University of Central Oklahoma*  
05.05.23  
05.05.24

**Chrapla, Grant** *Tulsa Community College*  
05.03.48

**Christophe, Deion** *University of Central Oklahoma*  
05.18.10

**Cisar, Cindy** *Northeastern State University*  
05.03.50  
05.11.03

**Clark, Adam** *Northeastern State University*  
05.02.01

**Clark, Ashley** *University of Tulsa*  
05.12.02

**Clark, Brian** *Northeastern State University*  
05.03.35

**Clark, Kara** *University of Central Oklahoma*  
05.08.13

**Clinton, Suzanne** *University of Central Oklahoma*  
01.03.03  
01.06.01

**Coffin, Benita** *Northwestern Oklahoma State University*  
02.04.10

**Coffman, Cristina** *University of Central Oklahoma*  
05.03.36

**Coker, Amanda** *University of Central Oklahoma*  
02.01.10

**Collins, Charles** *University of Central Oklahoma*  
05.08.29

**Collins, Julie** *University of Central Oklahoma*  
02.01.09

**Collins, Timothy** *University of Central Oklahoma*  
05.08.32

**Cook, Gregory** *Oklahoma State University*  
05.18.11

**Copeland, Kristopher** *Northeastern State University*  
04.01.01

**Coppedge, Bryan** *Tulsa Community College*  
05.19.01

**Corley, Jodi** *Saint Francis Hospita*  
02.03.16

**Cormell, Chad** *Southeastern Oklahoma State University*  
01.04.04

**Corrales Osorio,Adriana** *University of Illinois at Urbana-Champaign*

05.03.70

**Cothran,Rickey** *Southwestern Oklahoma State University*

05.03.105

**Covey,Kyle** *University of Central Oklahoma*

02.06.01

05.12.01

**Cox,Jordan** *Tulsa Community College*

05.03.47

05.03.49

**Cox,Whitney** *Northeastern State University*

05.14.02

**Cragg,Karie** *Northeastern State University*

05.17.26

05.17.29

**Craig,Bailey** *Northwestern State University*

05.03.34

**Craig,Cole** *University of Central Oklahoma*

05.03.41

**Craig,Rebecca** *University of Central Oklahoma*

03.02.02

**Crockett,Christine** *Northeastern State University*

05.07.04

**Crosby,Brock** *Cameron University*

03.04.09

**Crozier,Justin** *Northeastern State University*

05.06.27

**Crumrine,Daiquirie** *University of Oklahoma*

02.01.17

**Cuevas,Kathryn** *Southeastern Oklahoma State University*

05.03.93

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

02.01.11

**Cunningham,Candace** *University of Central Oklahoma*

02.01.10

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

01.03.02

01.03.03

01.06.01

**Curry,Philip** *Northeastern State University*

04.01.06

**Curtis,Olivia** *University of Central Oklahoma*

02.01.11

02.05.03

02.05.04

02.05.05

**Curtiss,Joshua** *Northeastern State University*

05.03.72

## D

**Daigle,Kay** *Southeastern Oklahoma State University*

02.05.01

**Dale,John** *East Central University*

05.05.03

**Dang,Ryan** *Cameron University*  
03.04.02  
03.04.10  
**Daniel,Abigail** *Northwestern Oklahoma State University*  
02.04.01  
**Dantzler-Kyer,Maryanne** *Southwestern Oklahoma State University*  
05.03.55  
**Darling,Joel** *University of Central Oklahoma*  
05.06.08  
**Das,Paritosh** *Cameron University*  
05.05.20  
**Das-bradoo,Sapna** *Northeastern State University*  
05.03.88  
05.03.90  
**Davis,Emily** *East Central University*  
04.02.04  
**Davis,Lindsay** *Langston University*  
05.05.40  
**Dawkins,Bryan** *University of Central Oklahoma*  
05.13.05  
**de Banzie,John** *Northeastern State University*  
05.11.03  
**Deatherage,Luvey** *East Central University*  
05.03.16  
**DeBolt,Darian** *University of Central Oklahoma*  
04.07.15  
**DeLeon,Alex** *Tulsa Community College*  
05.03.49  
05.09.10  
**DeLoach,Eugene** *Langston University*  
05.03.38  
**Dement,Megan** *University of Central Oklahoma*  
01.03.04  
**DeNeen,Whitney** *Northeastern State University*  
05.03.69  
**DeNike,Kayle** *East Central University*  
05.05.02  
**DeRosier,Dr. Wesley** *Northeastern State University*  
05.14.04  
**Diallo,Thierno** *Cameron University*  
01.04.07  
01.04.08  
**Dick,Brian** *Oklahoma School of Science and Mathematics*  
05.05.35  
**Dickerson,Taylor** *University of Central Oklahoma*  
01.07.01  
**Dickey,Alexia** *Northeastern State University*  
05.03.66  
**Dill,Dr. Mallorre** *Northeastern State University*  
05.14.04  
**Dill,Robert** *Cameron University*  
03.04.03  
**Dimanche,Rebecca** *University of Central Oklahoma*  
05.03.36

**DITZFELD, Christopher** *University of Arkansas*  
05.17.03  
**Do, Mai** *University of Central Oklahoma*  
05.03.71  
**Doan, Cuong** *University of Central Oklahoma*  
01.06.01  
**Dodson, Paige** *University of Central Oklahoma*  
01.06.06  
**Doughty, Austin** *University of Central Oklahoma*  
05.08.02  
05.08.22  
**Downen, Sarah** *Cameron University*  
05.17.15  
**Drissi, Jawad** *Cameron University*  
03.04.09  
03.04.10  
**Duffy, Chelsea** *Northwestern Oklahoma State University*  
02.04.02  
**Dunbar, Gabriel** *Northwestern State University*  
05.03.65  
**Durham, Justin** *University of Central Oklahoma*  
02.01.02  
05.17.11  
**Durning, Kiersten** *University of Central Oklahoma*  
02.01.13  
02.01.14  
**Dzul-Garcia, Charlotte** *Northeastern State University*  
02.05.10

## E

**Echavarri, Carlos** *University of Central Oklahoma*  
05.08.06  
**Edlin, David** *Iofina Resources, Inc*  
05.05.36  
**Edwards, Jennifer** *Northeastern State University*  
04.09.07  
**Edwards, Nathaniel** *Northeastern State University*  
05.14.01  
**Edwards, Roman** *University of Tulsa*  
05.12.02  
**Ekesi, Nnamdi** *Tulsa Community College*  
05.09.10  
**Elleman, Dallas** *Tulsa Community College*  
05.08.09  
**Elliott, Yoselin** *University of Central Oklahoma*  
05.03.112  
**Ellis, Katy** *Northeastern State University*  
01.06.11  
**Ellis, Shawna** *University of Central Oklahoma*  
05.05.11  
**Elmer, Ryanne** *Northeastern State University*  
05.14.03  
**Elmore, Leslie** *Oklahoma State University*  
05.09.07

**Embry, Kati** *University of Central Oklahoma*  
01.03.03  
**Esqueda, Carmen** *University of Central Oklahoma*  
05.03.37  
**Estes, James** *Northeastern State University*  
02.05.06  
**Evans, Christina** *University of Central Oklahoma*  
05.18.07  
**Evan, Russell** *University of Central Oklahoma*  
05.05.23  
05.05.24  
**Everly, Clarissa** *University of Oklahoma*  
04.05.01  
**Eversole, Dana** *Northeastern State University*  
04.01.08  
04.01.09  
04.01.10  
**Everson, Adam** *University of Central Oklahoma*  
05.17.24

## F

**Faghihi, Usef** *Cameron University*  
03.04.03  
03.04.08  
03.04.09  
03.04.10  
**Fakhr, Mohamed** *University of Tulsa*  
05.03.04  
05.03.111  
05.03.113  
05.03.114  
**Falhenkamp, Heather** *Oklahoma State University*  
05.08.36  
**Faw, Joshua** *University of Central Oklahoma*  
05.03.39  
**Fenwick, Allyson** *University of Central Oklahoma*  
05.03.07  
05.03.13  
**Fields, Joseph-Michael** *Langston University*  
05.03.08  
**Figueora, Luis** *University of Central Oklahoma*  
05.05.11  
**Fijalka, Daniel** *University of Central Oklahoma*  
05.08.20  
**Fike, Evan** *University of Central Oklahoma*  
02.03.11  
**Fischer, Hayley** *Northeastern State University*  
05.03.42  
**Fischer, Justin** *University of Central Oklahoma*  
05.08.04  
05.08.05  
**Fisher, Andrew** *Northeastern State University*  
05.03.46  
**Fischer, Mickayla** *University of Central Oklahoma*  
03.01.04

**Fleming,Christian** *University of Central Oklahoma*  
05.05.23  
05.05.24  
**Flowers,MacKenzie** *Northwestern Oklahoma State University*  
02.04.04  
**Floyd,Ashley** *Southeastern Oklahoma State University*  
05.11.01  
**Floyd,Stephanie** *University of Central Oklahoma*  
02.04.13  
**Flynn,Chandra** *Northwestern Oklahoma State University*  
02.04.05  
**Forbat,David** *University of Central Oklahoma*  
03.05.03  
**Ford,darrell** *University of Central Oklahoma*  
01.02.01  
01.02.03  
**Ford,Janice** *University of Central Oklahoma*  
05.13.15  
**Ford,Lance** *University of Central Oklahoma*  
05.13.07  
**Ford,Phillip** *Northeastern State University*  
02.03.10  
**Ford,Rebecca** *Southeastern Oklahoma State University*  
03.06.01  
**Fortner,Angela** *Tulsa Community College*  
05.03.48  
**Fox,Garey** *Oklahoma State University*  
05.09.07  
**Frech,Cheryl** *University of Central Oklahoma*  
05.05.12  
**Freeman,Lycinda** *Clemson University*  
05.06.17  
**Fu,Jicheng** *University of Central Oklahoma*  
05.06.07  
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05.06.13  
05.06.15  
05.06.18  
05.06.19  
05.06.20  
**Fukuda,Miwa** *University of Oklahoma*  
05.05.38  
**Fulgium,Jessica** *East Central University*  
04.01.02  
**Fulkerson,Michael** *University of Central Oklahoma*  
05.13.04  
05.13.08  
05.13.13  
**Fultz,Brandy** *Northeastern State University*  
05.03.88  
05.03.90

**G**

**Gabbard,Lanie** *University of Central Oklahoma*  
03.03.04

**Gainer, Sonnie** *University of Central Oklahoma*  
05.03.77

**Gammon, Christy** *University of Central Oklahoma*  
02.01.09

**Garcia, Alfredo** *Northeastern State University*  
05.03.63

**Garien, Cole** *University of Central Oklahoma*  
05.06.13  
05.06.19

**Garrett, Julia** *University of Central Oklahoma*  
05.18.07

**Gautier, Nicholas** *Cameron University*  
03.04.03

**gee, spencer** *University of Central Oklahoma*  
03.03.06

**Geiger, John** *Cameron University*  
05.17.15

**,Matt** *Northeastern State University*  
02.03.04

**,Seth** *Cameron University*  
05.05.38

**Genchev, Dr. Stefan** *University of Central Oklahoma*  
01.02.06

**George, Shaina** *University of Central Oklahoma*  
02.01.04

**Gesell, Jessica** *Cameron University*  
05.05.38

**Ghafil, Jalal** *University of Central Oklahoma*  
02.01.24

**Ghassoub, Dania** *University of Central Oklahoma*  
02.03.14

**Gholson, Jeffery** *Cameron University*  
03.04.03

**Gholson, Jeffrey** *Cameron University*  
03.04.08

**Gholson, Justin** *Cameron University*  
03.04.03  
03.04.08

**Ghosh, Shanta** *University of Central Oklahoma*  
05.13.08

**Gibson, Amanda** *University of Central Oklahoma*  
05.18.10

**Giese, Mark** *Northeastern State University*  
02.05.06  
02.05.07  
02.05.08  
02.05.09  
02.05.10

**Gillispie, Aric** *University of Central Oklahoma*  
05.08.08

**Girdner, Stephanie** *Northeastern State University*  
05.07.03

**Girisgin, Onur** *Uludag University*  
05.19.07



**Goines,Bobby** *Northeastern State University*  
05.06.02

**Golden,Teresa** *Southeastern Oklahoma State University*  
05.03.93

**Golenchenko,Sergey** *Belorusian State University*  
05.03.92

**Gomes,Brianna** *University of Central Oklahoma*  
04.07.09  
04.07.10  
04.07.11

**Gonzalez,Victor** *University of Kansas*  
05.03.101  
05.03.60  
05.19.07  
05.19.10

**Gooch,Jordan** *University of Central Oklahoma*  
05.18.07

**Graham,Justice** *Southeastern Oklahoma State University*  
03.06.02

**Graham,Melissa** *University of Central Oklahoma*  
01.07.07

**Granda Vega,Beitriz** *University of Central Oklahoma*  
05.18.07

**Gravchikov,Stan** *University of Central Oklahoma*  
05.06.16

**Graves,David** *University of Central Oklahoma*  
05.03.52

**Gray,Johnathan** *University of Central Oklahoma*  
01.03.07

**Greene,Nautica** *University of Central Oklahoma*  
01.06.01

**Greer,Stephanie** *University of Kansas*  
05.19.10

**Gregory,James** *University of Central Oklahoma*  
04.07.06

**Gregston,Jake** *Southwestern Oklahoma State University*  
05.03.83

**Grellner,Janelle** *University of Central Oklahoma*  
05.17.12

**Gropp,Chris** *Clemson University*  
05.06.17

**Grove,Roxanna** *University of Central Oklahoma*  
05.03.22

**Grubb,Tyler** *University of Central Oklahoma*  
05.08.03

**Guerrero,Lina** *Tulsa Community College*  
05.03.48

**Guidry,Jessie** *Northeastern State University*  
05.17.09

**Gunes,Nazmiye** *Uludag University*  
05.03.117

**Gunter,Stephanie** *Southeastern Oklahoma State University*  
05.03.02

**Guo,Yue** *University of Central Oklahoma*  
04.07.07

**Gutta,Sandeep** *Oklahoma State University*  
05.08.38  
**Gwin,Gregory** *Northeastern State University*  
05.17.09  
**Gwyn,Lori** *Southwestern Oklahoma State University*  
05.05.17  
05.05.18

## H

**Ha,Dao** *University of Central Oklahoma*  
01.05.03  
**habibi,azam** *University of Central Oklahoma*  
01.01.01  
**Hall,Deon** *University of Central Oklahoma*  
02.01.02  
05.17.11  
**Hall,Preston** *University of Central Oklahoma*  
05.03.06  
**Hall,Rashad** *Langston University*  
05.04.02  
05.04.05  
05.04.06  
**Hall,Yves Saint** *Northeastern State University*  
05.03.17  
**Hallock,Georgiana** *East Central University*  
04.01.12  
**Halterman,Erica** *University of Central Oklahoma*  
05.05.05  
05.08.02  
**Hampton,Holly** *University of Central Oklahoma*  
04.09.04  
**Hampton,Neal** *University of Central Oklahoma*  
04.07.04  
**Han,Ara** *University of Central Oklahoma*  
05.13.12  
**Hancock,Thomas** *University of Central Oklahoma*  
02.01.07  
05.17.02  
05.17.19  
**Hanna,Darby** *Northeastern State University*  
05.03.28  
**Harrigan,Trevor** *Cameron University*  
03.04.09  
**Harrington,Patrick** *Northeastern State University*  
05.06.01  
05.06.02  
**Harris,Linda** *University of Central Oklahoma*  
02.06.05  
**Harris,spencer** *University of Central Oklahoma*  
05.13.14  
**Hartley,Bruce** *East Central University*  
04.01.02  
04.01.13

**Hasanjee,Aamr** *University of Central Oklahoma*  
05.08.01  
05.08.02  
05.08.22

**Hassan,Salim** *Northeastern State University*  
05.06.01

**Haugen,Guillermo** *Southeastern Oklahoma State University*  
01.04.04

**Haws,Kyle** *University of Central Oklahoma*  
02.03.08  
05.17.08

**Haynie,Michelle** *University of Central Oklahoma*  
05.03.15  
05.03.24  
05.03.36

**Healey,Erin** *University of Central Oklahoma*  
05.18.07

**Heard,Darby** *East Central University*  
03.01.02

**Henderson,Kyle** *Northeastern State University*  
02.03.13

**Henderson,Thomas** *Tulsa Community College*  
05.08.09

**Henry,Chasten** *East Central University*  
01.04.01

**Henry,Isaac** *University of Central Oklahoma*  
02.03.19

**Hensley,Rhiannon** *University of Central Oklahoma*  
05.08.06

**Hepner,Michelle** *University of Central Oklahoma*  
01.05.03

**Herian,Courtney** *Northwestern Oklahoma State University*  
02.04.08

**Hess,Bethany** *Northeastern State University*  
02.03.03

**Hicks,Jaclyn** *Northeastern State University*  
02.03.03

**Hiddink,Seth** *University of Central Oklahoma*  
05.18.01  
05.18.02  
05.18.08

**Hilal,Mona** *University of Central Oklahoma*  
05.05.19

**Hillis,Nathan** *University of Central Oklahoma*  
05.03.57

**Hixon,Kathy** *Northeastern State University*  
02.05.12

**Hodges,Kyle** *University of Central Oklahoma*  
05.08.25

**,Tanner** *University of Central Oklahoma*  
01.03.04

**Hoenes,Richard** *Northeastern State University*  
02.05.06  
02.05.10

**Hoffman, Cori** *Northwestern State University*  
05.05.36

**Hoffpauir, Ryan** *University of Central Oklahoma*  
05.13.15

**Hogue, Debra** *University of Central Oklahoma*  
05.06.03  
05.06.04

**Holbert, Baylee** *Southeastern Oklahoma State University*  
05.03.01

**Holgado, Andrea** *Southwestern Oklahoma State University*  
05.03.81  
05.03.82  
05.03.83

**Hollinshead, Josh** *East Central University*  
01.04.01

**Holmes, Jennifer** *University of Central Oklahoma*  
05.18.08

**Holmes Ph. D., R.D., L.D., Dr. Tawni** *University of Central Oklahoma*  
02.01.24  
02.03.14  
05.09.09

**Holzmann, Matthew** *Oral Roberts University*  
02.03.18

**Hong, Moonki** *Cameron University*  
05.07.01

**Hopkins, Ashley** *Northeastern State University*  
05.03.27  
05.03.91

**Hopkins, Britney** *University of Central Oklahoma*  
05.13.11

**Horton, Amanda** *University of Central Oklahoma*  
03.03.03  
03.03.06

**Hossain, Mohammad** *Southwestern Oklahoma State University*  
05.15.01  
05.15.02  
05.15.04

**Hossan, Mohammad** *University of Central Oklahoma*  
05.08.12  
05.08.14  
05.08.32  
05.08.41

**Howard, Madison** *Northwestern State University*  
02.04.12

**Hranitz, John** *Bloomsburg University*  
05.03.101  
05.03.60  
05.19.07  
*University of Central Oklahoma*  
05.03.117

**Hsu, Judy** *Creative Process Research Lab*  
01.05.09

**,Kuang-Chung Hsu** *University of Central Oklahoma*  
01.03.01  
01.03.06

**Hu,Xiaowei** *Oklahoma State University*  
05.18.09  
**Huang,I-Lin** *Langston University*  
01.05.09  
**Huang,Shanshan** *University of Central Oklahoma*  
05.17.01  
**Hubin,Tim** *Southwestern Oklahoma State University*  
05.05.17  
05.05.18  
**Hubka,Karli** *Northeastern State University*  
05.14.06  
**Huffman,Jessica** *Southwestern Oklahoma State University*  
05.03.55  
**Hughes,Jack** *Cameron University*  
01.04.09  
01.04.11  
**Huhman,Ashley** *East Central University*  
05.13.06  
**Humphries,Michael** *University of Central Oklahoma*  
02.06.04  
**Hurt,Kari** *Northeastern State University*  
02.01.22  
**Hurt,Rachel** *Southwestern Oklahoma State University*  
02.01.19  
05.08.37  
**Husak,Michael** *Cameron University*  
05.19.08  
**Huskey,Alisa** *University of Central Oklahoma*  
02.03.08  
05.17.07  
05.17.08  
**Hussaini,Syed** *University of Tulsa*  
05.05.15  
**hwang,ahram** *University of Central Oklahoma*  
01.07.08  
**Hyde,Deborah** *Northeastern State University*  
05.09.04

## I

**Iliff,Mary** *Southwestern Oklahoma State University*  
04.08.06  
**Isenberg,Saranah** *Cameron University*  
05.03.96

## J

**Jackson,Heather** *Rogers State University*  
05.03.84  
**Jackson,Karisha** *Cameron University*  
03.04.04  
03.04.05  
03.04.06  
**Jackson,Keith** *University of Central Oklahoma*  
05.05.10  
**Jackson,Tom** *Northeastern State University*  
02.01.18

**Jahn, Jesse** *Southwestern Oklahoma State University*  
05.03.98

**James, Morgan** *Langston University*  
05.03.104

**Jansing, Elizabeth** *Southwestern Oklahoma State University*  
05.03.82

**Jarshaw, Jane** *University of Central Oklahoma*  
05.03.39  
05.05.13

**Jay, Brent** *University of Central Oklahoma*  
01.05.02

**Jent, Kelly** *University of Central Oklahoma*  
05.17.19

**Jetto, Carissa** *University of Central Oklahoma*  
05.09.08

**Jeyaraj-Powell, Tephillah** *University of Central Oklahoma*  
05.17.14

**Jiang, Yuhao** *University of Central Oklahoma*  
05.08.06  
05.08.16

**Jog, Chintamani** *University of Central Oklahoma*  
01.03.06

**Johari, Abbas** *Cameron University*  
03.04.04  
03.04.05  
03.04.06

**Johnson, Alicia** *University of Central Oklahoma*  
01.06.07

**Johnson, Amy** *University of Central Oklahoma*  
03.03.02

**Johnson, Gabriel** *Tulsa Community College*  
05.03.48

**Johnson, Jordan** *University of Central Oklahoma*  
05.08.11

**Johnson, Katherine** *Cameron University*  
04.02.02

**Johnson, Mark** *University of Central Oklahoma*  
02.03.17

**Johnson, spencer** *Northeastern State University*  
05.14.03

**Johnson, William** *Cameron University*  
03.04.04  
03.04.05  
03.04.06

**Johnson, Zack** *University of Central Oklahoma*  
05.08.19  
05.08.29

**Johnston, Jonathon** *University of Central Oklahoma*  
05.03.04

**Jones, Alexis** *Northeastern State University*  
05.03.69

**Jones, Austin** *University of Central Oklahoma*  
05.19.04

**Jones, Dillon** *Oklahoma State University*  
05.03.116

**Jones,Kelsi** *East Central University*  
04.01.13  
**Jones,Ralph** *University of Central Oklahoma*  
05.03.110  
**Jordan,Mary** *Langston University*  
05.03.106  
**Jordan,Ryan** *University of Central Oklahoma*  
05.08.29  
05.08.34  
**Jourdan,Thomas** *University of Central Oklahoma*  
05.03.11

## K

**Kaan,Kalkan** *Oklahoma State University*  
05.03.83  
**Kaiser,Corie** *Northwestern Oklahoma State University*  
02.04.01  
**Kaliraj,Manit** *University of Central Oklahoma*  
05.08.21  
**Kaltenbach,Carrie** *Northwestern State University*  
02.04.09  
**Karber,Kristi** *University of Central Oklahoma*  
05.13.11  
**Karimi,Boshra** *Oklahoma State University*  
05.08.44  
05.08.45  
05.08.46  
05.08.47  
**Karpenko,Veronika** *University of Central Oklahoma*  
05.17.08  
**Karpowicz,Steven** *University of Central Oklahoma*  
05.03.22  
05.03.71  
05.03.74  
05.08.13  
05.08.14  
05.08.20  
05.08.41  
**Karr,Patrick** *Northwestern Oklahoma State University*  
02.04.09  
**Karsten,William** *University of Oklahoma*  
05.05.23  
05.05.24  
**Kaya,Halil** *Northeastern State University*  
01.04.02  
01.04.03  
**Keating,Shawn** *University of Central Oklahoma*  
01.02.03  
**Keller-Dupree,Elizabeth** *Northeastern State University*  
05.17.09  
05.17.28  
**Kelley,Ciera** *Cameron University*  
05.05.38  
**Kenaston,Jeremy** *Northwestern State University*  
04.09.05

**Kessler,Emily** *Southwestern Oklahoma State University*  
05.03.92

**khadiri,Mohamed** *University of Central Oklahoma*  
05.10.01

**Khadka,Pritika** *University of Central Oklahoma*  
05.03.12

**Khan,M.O. Faruk** *Southwestern Oklahoma State University*  
05.15.01  
05.15.02  
05.15.04

**Khan,Taimoor** *Northeastern State University*  
05.05.09

**Khandaker,Morshed** *University of Central Oklahoma*  
05.08.19  
05.08.25  
05.08.28  
05.08.29  
05.08.34  
*University of Oklahoma*  
05.08.30

**Khoury,Danielle** *Southeastern Oklahoma State University*  
05.03.02

**Kibble,Geoffrey** *Oklahoma State University*  
05.08.27

**Kim,Hyunjong** *University of Central Oklahoma*  
05.03.23

**,Sung-Kun** *Northeastern State University*  
05.05.01

**Kimmel,Laura** *University of Central Oklahoma*  
05.03.07  
05.03.13  
05.03.15

**King,Chad** *University of Central Oklahoma*  
05.03.19  
05.03.20  
05.03.37  
05.03.76

**,Melicent** *University of Central Oklahoma*  
05.06.10  
05.06.11

**Kirchubel,Joy** *Tulsa Community College*  
04.09.06

**Kirk,Dianne** *Northeastern State University*  
05.02.01

**Kliewer,Darcey** *Northwestern State University*  
02.04.02

**Knight,Joshua** *University of Central Oklahoma*  
05.03.67

**Knottnerus,J. David** *Oklahoma State University*  
04.09.07

**Komeni,Alain** *University of Central Oklahoma*  
05.03.06

**Kosin,Jane** *Northeastern State University*  
02.03.05



**Kositchaiwat,Patra** *Southwestern Oklahoma State University*

05.17.22

**Kotturi,Hari** *University of Central Oklahoma*

05.03.12

05.03.41

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

01.04.10

**Kshetri,Pratiksha** *University of Central Oklahoma*

05.03.14

**Kuba,Renan** *University of Central Oklahoma*

05.06.21

**Kulkarni,Prateek** *Oklahoma State University*

05.08.15

**Kumalasari,Meity** *University of Central Oklahoma*

02.03.09

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

02.02.03

**Kwak,Sukyoung** *University of Central Oklahoma*

05.03.74

## L

**Lack,Caleb** *University of Central Oklahoma*

02.01.02

02.03.08

05.17.07

**Ladwig,Samuel** *University of Central Oklahoma*

03.03.01

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

01.07.02

01.07.03

**Lamb,Brian** *University of Central Oklahoma*

03.05.02

**Lambert,Christopher** *Cameron University*

03.04.01

**Landers,Sarah** *University of Central Oklahoma*

01.07.07

**Landoll,Diane** *University of Oklahoma*

05.19.08

**Laubach,Leann** *University of Central Oklahoma*

02.04.15

**Laverty,Sean** *University of Central Oklahoma*

05.09.06

05.13.05

05.13.10

**Lavine,Barry** *Oklahoma State University*

05.05.10

05.05.13

**Law,Ingrid** *Southwestern Oklahoma State University*

05.08.37

**Layton,Elivia** *University of Central Oklahoma*

05.08.01

**Lee,Barrett** *Oklahoma State University*

05.08.15

**LeFlore,Laci** *Southeastern Oklahoma State University*

05.03.09

**Lemley,Evan** *University of Central Oklahoma*  
02.01.20  
05.08.08

**Leon,Christopher** *University of Central Oklahoma*  
01.03.07

**Letourneau,Kathryn** *University of Oklahoma*  
04.09.01

**Lewerenz,David** *Northeastern State University*  
02.03.10

**Lewis,Dalton** *Edmond North HS*  
05.05.11

**Lewis,Sharon** *Langston University*  
05.06.09

**Li,Jack** *Southwestern Oklahoma State University*  
05.08.40

**Li,Wenwen** *University of Central Oklahoma*  
05.13.04

**Li,Yanling** *University of Central Oklahoma*  
05.08.30

**Liang,Mei** *Clemson University*  
05.06.17

**Lieber,Stephanie** *University of Central Oklahoma*  
05.17.04

**Lim,Oon Feng** *University of Central Oklahoma*  
01.07.02  
01.07.03

**Lin,Jiajun** *East Central University*  
01.04.01

**Lin,Ying-Chou** *Southeastern Oklahoma State University*  
01.04.04

**Lin,Yunhao** *University of Central Oklahoma*  
05.08.03

**Lin,Zhi** *University of Central Oklahoma*  
05.18.07

**Little,Erin** *Northwestern State University*  
05.03.25

**Littlefield,Michelle** *University of Central Oklahoma*  
05.03.39

**Liu,Tao** *University of Central Oklahoma*  
05.06.18

**Lloyd,TaJae'** *Langston University*  
05.03.99

**Longhorn,Donna** *University of Central Oklahoma*  
02.01.12

**Lopez,Erika** *University of Tulsa*  
05.05.15

**Lopez Gonzales,Maria Laura** *Cameron University*  
02.01.16

**Lord,Wayne** *University of Central Oklahoma*  
05.03.11

**Ludlum,Marty** *University of Central Oklahoma*  
01.02.01  
01.02.02

**Lutter,Erika** *Oklahoma State University*  
05.03.103

**Lyon,Maximilian** *University of Central Oklahoma*  
05.03.53

M

**May,Charlotte** *East Central University*

02.04.14

**Ma,Yifei** *East Central University*

01.04.01

**Madanipour,Ali** *Cameron University*

03.04.08

**Magiera,Kelsie** *University of Central Oklahoma*

05.05.10

**Magness,Matt** *University of Central Oklahoma*

04.09.02

**Mahee,Dimitri** *Northeastern State University*

05.03.58

**Maier,Elizabeth** *University of Central Oklahoma*

04.09.01

**Maloy,L:iesl** *Northwestern State University*

02.04.12

**Manes,Jason** *Northeastern State University*

05.14.08

**Manimala,James** *Oklahoma State University*

05.08.15

05.08.31

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

01.06.10

**Marasini,Daya** *University of Tulsa*

05.03.111

**Martin,Heather** *University of Central Oklahoma*

05.17.12

**Martin,Jake** *University of Tulsa*

05.12.02

**Martin,Jessica** *Northeastern State University*

05.05.42

**Martinez Scobell,Lauren** *Northwestern Oklahoma State University*

05.15.03

**Massengill,Jeremy** *University of Central Oklahoma*

05.09.06

**Mast,Stephanie** *Northwestern Oklahoma State University*

02.04.04

**Matheny,Audrey** *University of Central Oklahoma*

05.03.07

05.03.13

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

02.01.02

02.01.13

02.01.14

**Mathes,Taylor** *Northwestern Oklahoma State University*

02.04.05

**Mathis,Tyler** *Northeastern State University*

05.06.26

**Mattson,Jennifer** *East Central University*

05.19.03

**McArtor,Jon** *University of Tulsa*  
05.12.02

**McCann,Jennifer** *Northeastern State University*  
02.01.18

**McCarthy,Ryan** *University of Tulsa*  
05.06.23

**McClelland,Amanda** *University of Central Oklahoma*  
02.06.01  
05.12.01

**McCown,Margaret** *University of Central Oklahoma*  
04.07.12

**McCraw,Shannon** *Southeastern Oklahoma State University*  
04.01.07

**McCurdy,Martin** *Oklahoma State University - Institute of Technology*  
01.05.07

**McElroy,Kaitlyn** *University of Central Oklahoma*  
05.17.06

**McGee,Abigail** *University of Central Oklahoma*  
05.03.11

**McGill,Connor** *University of Central Oklahoma*  
05.03.21

**McInnes,Daniel** *East Central University*  
05.05.02

**McIntyre,Evan** *University of Central Oklahoma*  
05.05.10

**McIntyre,Holly** *Northeastern State University*  
05.03.88

**McKee,Alan** *Northeastern State University*  
05.14.08

**McKee,Dr. Victoria** *University of Central Oklahoma*  
01.06.06

**McKisson,Abby** *Southwestern Oklahoma State University*  
05.03.83

**Mecham,VeraLynn** *Northeastern State University*  
02.03.16

**Meizan,Abdul** *University of Central Oklahoma*  
01.03.04

**Melakayil,Eunice** *University of Central Oklahoma*  
05.17.10

**Melone,Taylor** *Northeastern State University*  
01.06.11

**Melton,Cody** *Northeastern State University*  
02.01.23

**Mera,Alejandra** *Northeastern State University*  
05.03.50

**Meraou,Hannah** *Northeastern State University*  
05.03.68

**Mesiya,Sidra** *University of Central Oklahoma*  
05.05.23

**Metts,Michaela** *University of Central Oklahoma*  
05.03.39

**Metz,Neil** *University of Central Oklahoma*  
01.03.06

**Mewherter,Angela** *Northwestern Oklahoma State University*  
05.15.03

**Meyer, Kristey** *University of Central Oklahoma*  
05.18.07

**Meza, Nayeli** *Northwestern Oklahoma State University*  
02.04.08

**Michela, Jordan** *University of Central Oklahoma*  
05.06.32  
05.13.16

**Miller, Christopher** *Northeastern State University*  
03.06.04

**Miller, Cody** *Northeastern State University*  
05.03.107

**Miller, Kama** *University of Central Oklahoma*  
05.08.43

**Miller, Michelle** *University of Central Oklahoma*  
02.03.12

**Milligan, Thomas** *University of Central Oklahoma*  
05.13.11

**Mitchell, Jeanea** *Southeastern Oklahoma State University*  
05.11.02

**Mitchell, Lacey** *University of Tulsa*  
05.12.02

**Molnar, Marisa** *Southwestern Oklahoma State University*  
04.08.08

**Monroe, Kelsee** *Cameron University*  
05.17.03

**montalvo, Daniel** *University of Central Oklahoma*  
05.05.16

**Montes, Luis** *University of Central Oklahoma*  
05.05.12

**Moore, Amanda** *University of Central Oklahoma*  
04.07.01

**Moore, John** *Northeastern State University*  
05.05.29

**Morris, Ann** *Cameron University*  
01.04.09  
01.04.11

**Morris, Tracy** *University of Central Oklahoma*  
05.18.05  
05.18.06  
05.18.10

**Morrison, Mike** *Southwestern Oklahoma State University*  
05.06.33

**Mosburg, Callie** *Northeastern State University*  
05.14.02

**MOUSSA, ABDELLAH** *University of Central Oklahoma*  
05.08.03  
05.08.04  
05.08.05  
05.08.07

**Mrchkovska, Nela** *University of Central Oklahoma*  
01.03.06  
05.18.05

**Mucklerath, Halie** *Oklahoma State University*  
05.18.11

**Munholland,Landi** *Southeastern Oklahoma State University*

05.11.02

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

01.02.06

**Murphy,Erinn** *University of Central Oklahoma*

05.03.52

05.18.07

**Murray,Ashley** *University of Toledo*

05.17.22

**Murray,Cynthia** *University of Central Oklahoma*

05.18.01

05.18.02

05.18.08

**Murray,Phillip** *Northeastern State University*

05.05.06

**Myers,Brittany** *University of Central Oklahoma*

05.13.07

**Myers,Dwight** *East Central University*

05.05.39

## N

**Nalley,Elizabeth** *Cameron University*

05.05.37

05.05.38

**Nandedkar,Ankur** *Cameron University*

01.06.05

01.06.09

**Naranjo,Shiala** *University of Central Florida*

05.03.117

05.03.60

**Nchinda,Hedrine** *University of Central Oklahoma*

05.08.07

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

01.07.04

01.07.05

01.07.06

**Neese,Sarah** *University of Central Oklahoma*

01.07.04

01.07.05

01.07.06

**NEIGHBORS,Matthew** *University of Central Oklahoma*

05.08.17

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

02.01.10

02.01.11

**Newby,Johnna** *Cameron University*

01.06.08

**Newsome,Jonathan** *Southeastern Oklahoma State University*

05.03.01

**Newton,David** *University of Central Oklahoma*

04.09.01

**Neyaz,Leena** *University of Tulsa*

05.03.114

**Ngo,Erica** *Northeastern State University*

05.14.04

**Nguyen,Huong** *University of Central Oklahoma*  
01.07.10  
**Nguyen,Julie** *Cameron University*  
04.02.01  
**Nguyen,Thi** *University of Central Oklahoma*  
05.03.71  
05.08.13  
05.08.20  
**Nguyen,Thien** *Northeastern State University*  
02.03.05  
**Nichols,Jennifer** *Tulsa Community College*  
05.03.47  
05.03.49  
**Nichols,Madison** *Northwestern Oklahoma State University*  
02.04.01  
**Nighswonger,Lindsey** *Northwestern Oklahoma State University*  
02.04.04  
**Noble,Tyler** *Tulsa Community College*  
05.03.49  
05.09.10  
**Noel,David** *University of Central Oklahoma*  
01.05.02  
**Norris,Chelsi** *East Central University*  
01.01.02

O

**Obi,Cassandra** *Southwestern Oklahoma State University*  
05.15.02  
**O'Brien,Valerie** *Tulsa Community College*  
05.03.47  
**Odo,Jonathan** *Cameron University*  
05.07.01  
**Oertel,Megan** *Southwestern Oklahoma State University*  
05.05.18  
**Olasmis,Hakan** *University of Central Oklahoma*  
05.08.29  
**Olmstead,Justin** *University of Central Oklahoma*  
04.07.02  
**Olson,Jacilyn** *University of Central Oklahoma*  
02.06.01  
05.12.01  
**Omena,ANDRE** *University of Central Oklahoma*  
05.08.17  
**Omena,Thiago** *University of Central Oklahoma*  
05.08.14  
05.08.41  
**O'Neal-Johnson,Sequojah** *Southwestern Oklahoma State University*  
05.05.17  
**Orso,Vikki** *East Central University*  
05.13.09  
**Osburn,Felicia** *University of Central Oklahoma*  
05.03.39  
**Ovrebø,Clark** *University of Central Oklahoma*  
05.03.70

**Ozturk,Ahmet** *Northeastern State University*  
02.05.10

P

**Paidimarri,Vishnu** *Oklahoma State University*  
05.08.15  
**Paiva,Nancy** *Southeastern Oklahoma State University*  
05.05.04  
**Pal,Arpan** *University of Tulsa*  
05.05.15  
**Pantoja,Joana** *University of Central Oklahoma*  
05.03.77  
**Pappas,Christine** *East Central University*  
04.08.05  
**Park,Myung Ah** *University of Central Oklahoma*  
05.06.35  
**Parker,Claudia** *Southwestern Oklahoma State University*  
04.08.04  
**Parker,James** *Northeastern State University*  
04.01.05  
**Parrish,Justin** *Northeastern State University*  
05.03.90  
**Pascual,Elizabeth** *Oklahoma State University*  
05.03.103  
05.03.45  
**Pasternack,Robyn** *University of Central Oklahoma*  
03.02.01  
**Pastor,Maria Jose** *San Francisco State University*  
05.03.117  
05.03.60  
**Patel,Harsh** *Northeastern State University*  
05.03.100  
**Patrick,Michael** *University of Central Oklahoma*  
01.03.05  
**Patrick,Ofelia** *Northeastern State University*  
05.03.107  
**Patton,Christopher** *University of Central Oklahoma*  
05.03.12  
**Patton,Ry** *University of Kansas*  
05.19.07  
**Paul,Eric** *Southwestern Oklahoma State University*  
05.03.98  
**Paulissen,Mark** *Northeastern State University*  
05.03.50  
**Payne,Rachel** *University of Central Oklahoma*  
02.02.01  
**Paynter,Bradley** *University of Central Oklahoma*  
02.01.20  
05.06.32  
05.13.14  
05.13.15  
05.13.16  
**Penland,Mariah** *Northeastern State University*  
05.05.28



**Penn,Chad** *Oklahoma State University*  
05.09.07

**Penning,Cole** *University of Central Oklahoma*  
05.06.30

**Perkins,Tamatha** *University of Central Oklahoma*  
05.18.07

**Perkins,Zachary** *University of Central Oklahoma*  
01.03.01

**Perlingiere,Danielle** *University of Central Oklahoma*  
05.18.01  
05.18.02

**Perrin,Kelsey** *Northeastern State University*  
01.06.11

**Perry,Rachel** *University of Tulsa*  
05.12.02

**Petanidou,Theodora** *University of the Aegean*  
05.03.101

**Peter,Kyle** *Northeastern State University*  
02.03.10

**Phan,Thong** *East Central University*  
05.16.03

**Phelps,Joshua** *University of Central Oklahoma*  
03.05.02

**Phillips,Mary** *Southwestern Oklahoma State University*  
05.06.17

**Phipps,Catherine** *East Central University*  
05.19.05

**Pilcher,Spence** *Northeastern State University*  
05.05.25

**Pinkstaff,Adrienne** *Northeastern State University*  
05.13.02

**Place,Aaron** *Northwestern State University*  
05.03.65

**Plascencia,Montserrat** *University of California Santa Cruz*  
05.03.117  
05.03.60  
05.19.07

**Pollard,Kellyn** *Langston University*  
05.06.09

**Pope,Carey** *Oklahoma State University*  
05.03.83

**Porter,Hunter** *University of Oklahoma*  
05.03.54

**Postoak,Tiffany** *East Central University*  
04.08.01

**Powell,Laura** *University of Central Oklahoma*  
05.03.110

**Powers,Ashley** *Southwestern Oklahoma State University*  
05.03.81

**Powers,Melissa** *University of Central Oklahoma*  
02.01.11

**Prado,Taylor** *University of Central Oklahoma*  
01.02.03

**Prather,Larry** *Southeastern Oklahoma State University*  
01.04.04

**Price,Ron** *Cameron University*  
04.01.14  
04.01.15  
**Price,Tricia** *Northeastern State University*  
04.01.04  
**Proctor,Alissa** *Northeastern State University*  
05.14.06  
**Pursley,Robyn** *Northeastern State University*  
03.06.04  
**Pursley,Scott** *Northeastern State University*  
03.06.04  
**Putnam,Joshua** *University of Central Oklahoma*  
02.01.10  
**Pyle,Jordan** *University of Central Oklahoma*  
05.17.19  
**Qayyum,Arif** *Cameron University*  
01.04.05  
01.04.06  
01.04.07  
01.04.08  
01.04.09  
01.04.11

## Q

**Qian,Gang** *University of Central Oklahoma*  
05.06.16  
05.06.24  
**Quadri,Yetundi** *University of Central Oklahoma*  
02.01.10  
**Quiram,Loren** *Northwestern State University*  
02.04.06

## R

**Rabei,Sheyla** *University of Central Oklahoma*  
05.08.01  
**Ragle,Bethany** *East Central University*  
05.09.11  
**Rahman,A.K.Fazlur** *Oklahoma School of Science and Mathematics*  
05.05.27  
05.05.31  
05.05.32  
05.05.33  
05.05.34  
05.05.35  
**Rajbanshi,Naveen** *University of Tulsa*  
05.03.108  
05.03.109  
**Ralstin,Austin** *University of Central Oklahoma*  
04.09.04  
**Ramirez,Felix** *University of Central Oklahoma*  
05.03.102  
**Ramsey,Shey** *University of Central Oklahoma*  
05.03.20  
**Randall,J** *Cameron University*  
05.17.15

**Ravikumar,Rukmini** *University of Central Oklahoma*  
03.03.06

**Reagan,Sarah** *Southeastern Oklahoma State University*  
05.03.01

**Redd,JeAnna** *University of Central Oklahoma*  
05.03.101

**Reece,Jedediah** *Northeastern State University*  
02.03.07

**Reeve,Elizabeth** *Other Institution*  
02.01.01

**Reeves,Kyle** *East Central University*  
05.13.17

**Rehman,Omer** *Cameron University*  
01.04.05

**REKHY,ANUJ** *Oklahoma State University*  
05.08.31

**Releford,Darion** *Northeastern State University*  
05.17.20

**Remy-Schumacher,Tess** *University of Central Oklahoma*  
03.05.01

**Renaldi,FNU "Ray"** *University of Central Oklahoma*  
05.06.24

**Revels,Mia** *Northeastern State University*  
05.03.28

**Riahinezhad,shahram** *University of Central Oklahoma*  
05.08.23

**Rice,Norma** *College of the Mvskoke Nation*  
05.03.64

**Rice,Samantha** *Tulsa Community College*  
05.03.49

**Richards,Hannah** *Cameron University*  
05.19.08

**Richardson,Brittany** *University of Central Oklahoma*  
03.05.02

**Richett,Shelbi** *University of Central Oklahoma*  
05.03.19

**Ricks,Colby** *Northeastern State University*  
02.03.13

**Riddle,Skylar** *East Central University*  
04.08.05

**Riederer,Alanna** *University of Central Oklahoma*  
05.06.32

**Riggin,Brittany** *University of Central Oklahoma*  
02.01.07

**Riggs,Shaina** *Northeastern State University*  
05.03.86

**Rivas,Alexander** *Cameron University*  
05.05.37

**Rivas,Jayne** *University of Central Oklahoma*  
01.02.04

**Roberts,Sarah** *Southeastern Oklahoma State University*  
01.06.02

**Robinson,Emily** *Southeastern Oklahoma State University*  
01.06.02

**Rodne,Rumer** *University of Central Oklahoma*  
05.05.21  
**Rodriguez,Ashley** *Southwestern Oklahoma State University*  
05.03.82  
**Rodriguez,Jennifer** *Northeastern State University*  
05.17.09  
**Rogers,Brittney** *Northeastern State University*  
05.05.07  
**ROMERO,Brenda** *Tulsa Community College*  
05.03.118  
**Romine,Brooke** *Oklahoma State University*  
05.03.30  
05.03.31  
05.03.32  
05.03.33  
**Rosener,William** *Northeastern State University*  
01.05.01  
**Ross,Antonio** *University of Central Oklahoma*  
02.03.15  
**Ross,Elaina** *Northeastern State University*  
04.01.01  
**Ross,Lauren** *University of Central Oklahoma*  
03.01.01  
**Rouf,A.S.S.** *Other Institution*  
05.15.01  
**Rubidoux,Laurelyn** *Tulsa Community College*  
05.04.01  
**Rudebock,Diane** *University of Central Oklahoma*  
02.03.01  
**Rudraraju,Apoorva** *Southwestern Oklahoma State University*  
05.15.01  
05.15.04  
**Rundle,Dana** *University of Central Oklahoma*  
05.03.102  
**Rupp,Gabriel** *University of Central Oklahoma*  
05.17.05  
**Ruskoski,Sallie** *Northeastern State University*  
02.03.16  
05.02.01  
**Rutter,Andrew** *Cameron University*  
03.04.09  
*Northeastern State University*  
05.03.90  
05.19.09  
*University of Central Oklahoma*  
01.03.07  
02.03.08  
05.08.23  
*University of Oklahoma*  
05.05.23  
**Ryan,Brooklin** *Oklahoma State University*  
05.08.36

**Saenz,Adrian** *Oklahoma State University*  
05.08.26

**Salazar,Timothy** *University of Chicago*  
05.03.117  
05.03.60

**Salkeld,Patrick** *University of Central Oklahoma*  
04.07.14

**Salmon,Erika** *Northeastern State University*  
02.05.02

**Salmon,Thomas** *Northeastern State University*  
02.05.02  
05.14.01

**Saluja,Hardeep** *Southwestern Oklahoma State University*  
05.15.01

**Saluja,Prabhjyot** *Southwestern Oklahoma State University*  
05.15.04

**Samaraweera,Manoshi** *University of Central Oklahoma*  
01.07.11  
01.07.12

**Samuels,Patrice** *Northeastern State University*  
05.03.115

**Sanchez,Tony** *Southwestern Oklahoma State University*  
05.03.83

**Sanders,Jessica** *University of Central Oklahoma*  
05.18.01  
05.18.02  
05.18.05  
05.18.06

**Sandhar,Baljit** *Northeastern State University*  
05.05.41

**Satchell,Angeline** *University of Central Oklahoma*  
05.03.56

**Saunders,Debra** *Oklahoma Medical Research Foundation*  
05.08.22

**Schlumbohm,Douglas** *Cameron University*  
03.04.09  
05.06.31

**Schrantz,Kathryn** *University of Central Oklahoma*  
05.17.07

**Schroeder,Alexis** *Southwestern Oklahoma State University*  
05.17.21

**,Kayla** *Northeastern State University*  
05.11.03

**Scribner,Thelma** *Southeastern Oklahoma State University*  
03.01.03

**Sealey-Holtz,Linda** *University of Central Oklahoma*  
02.06.01  
02.06.04  
05.12.01

**Seals,Katherine** *East Central University*  
03.01.02

**Searcy,Jackie** *Northeastern State University*  
05.06.29

**Seay,Lillian** *University of Central Oklahoma*  
05.08.24

**SEMANDS,John** *University of Central Oklahoma*  
05.08.17

**Serna,Misael** *University of Central Oklahoma*  
01.05.04

**Shang,Yuhang** *University of Central Oklahoma*  
05.03.04

**Shannon,Tyler** *Southeastern Oklahoma State University*  
05.05.04

**Sharma,Sagar** *University of Central Oklahoma*  
05.08.21

**Sharp,James** *Southeastern Oklahoma State University*  
05.05.04

**,Patrick** *Southeastern Oklahoma State University*  
05.03.02

**Shearer,Lori** *Northwestern State University*  
05.15.03

**Sheetz-Nguyen,Jessica** *University of Central Oklahoma*  
04.07.17

**Shepherd,Eli** *Oklahoma State University*  
05.08.26

**Sheppard,Cassi** *Southeastern Oklahoma State University*  
03.01.03

**Shi,Wei** *Northeastern State University*  
02.05.11

**Shiraiwa,Shikoh** *University of Central Oklahoma*  
04.07.13

**Shirali,Yasmin** *University of Central Oklahoma*  
02.01.08

**Shirali,Yasmine** *University of Central Oklahoma*  
02.03.08

**Shiwakoti,Ashma** *East Central University*  
05.16.02

**shrestha,anjuli** *Southwestern Oklahoma State University*  
05.15.01  
05.15.02

**Shrestha,Sajana** *University of Central Oklahoma*  
01.05.05

**Shretha,Alina** *Southwestern Oklahoma State University*  
05.03.98

**Shuff,Jalea** *University of Central Oklahoma*  
02.02.02

**Shukla,Rashi** *University of Central Oklahoma*  
04.09.01  
04.09.02

**Simo,Jean** *University of Central Oklahoma*  
05.09.09

**Simpson,Trey** *Oklahoma State University*  
05.08.36

**Sims,Atoya** *University of Central Oklahoma*  
01.07.04  
01.07.05  
01.07.06

**Sims, Jeanetta** *University of Central Oklahoma*  
01.07.01  
01.07.02  
01.07.03  
01.07.04  
01.07.05  
01.07.06  
02.02.02  
**Sims, William Scott** *University of Central Oklahoma*  
05.17.14  
**Simsek, Zinar** *Oklahoma State University*  
05.03.78  
05.03.79  
05.03.80  
**Sinnett, Phillip** *Oklahoma State University*  
05.18.11  
**Sismon Cooley, Juliana** *Northwestern State University*  
02.04.07  
**Skelton, Elle** *University of Central Oklahoma*  
02.01.11  
**Skibstead, Hollie** *Redlands Community College*  
05.09.01  
**Skinner, Faith** *University of Central Oklahoma*  
03.05.02  
**Skorupski, Taylor** *Northeastern State University*  
05.03.40  
**Sloan, Dusti** *Tulsa Community College*  
05.09.10  
**Smith, Breanna** *University of Central Oklahoma*  
05.18.07  
**Smith, Nataliya** *Oklahoma Medical Research Foundation*  
05.08.22  
**Smith, Regina** *University of Central Oklahoma*  
05.08.14  
05.08.41  
**Smith, Robert** *University of Central Oklahoma*  
05.06.32  
05.13.16  
**Smith, Todd** *Northeastern State University*  
05.03.107  
**Sobansky, Robin** *Southwestern Oklahoma State University*  
02.06.02  
**Soderstrom, Kristal** *Northeastern State University*  
02.01.06  
**Song, Keren** *University of Central Oklahoma*  
05.08.33  
**Song, Tiffany** *Northwestern Oklahoma State University*  
02.04.03  
**Sorrell, Morgan** *University of Central Oklahoma*  
04.02.03  
04.07.18  
04.07.19  
**Sousa Junior, Wanderley** *University of Central Oklahoma*  
02.03.06

**Spencer,Chelsea** *University of Central Oklahoma*  
05.03.05  
05.08.06

**Spencer,Diana** *Tulsa Community College*  
05.03.47  
05.03.48  
05.03.49

**Sperring,Cynthia** *Northeastern State University*  
05.17.26  
05.17.28  
05.17.29

**Stanglin,Madison** *Southeastern Oklahoma State University*  
05.11.01

**Statton,Allison** *Southwestern Oklahoma State University*  
05.04.03

**Steinhart,Alexis** *University of Central Oklahoma*  
05.18.07

**Stevens,Christopher** *Southwestern Oklahoma State University*  
05.17.18

**Stewart,Katherine** *Northwestern State University*  
02.04.09

**Stewart,Matthew** *Northeastern State University*  
05.06.28

**Stewart,Staci** *Northwestern State University*  
02.04.02

**Stie,Alan** *Tulsa Community College*  
05.19.01

**Stiles,Cerina** *East Central University*  
05.05.39

**Still,Corey** *Northeastern State University*  
02.01.15

**Stone,Lindsay** *University of Central Oklahoma*  
05.03.24

**Stone,Paul** *University of Central Oklahoma*  
05.03.15  
05.09.06

**Stoneberg,Danielle** *University of Central Oklahoma*  
04.09.02

**Storm,Daniel** *Oklahoma State University*  
05.09.07

**Stovall,Lyndee** *University of Central Oklahoma*  
02.06.03  
02.06.04

**Strain,Ashley** *Northeastern State University*  
05.03.94  
05.03.95

**Stratmoen,Evelyn** *University of Central Oklahoma*  
05.17.02

**Sundy,Kristina** *University of Central Oklahoma*  
05.13.14

**Sung,Hong** *University of Central Oklahoma*  
05.06.08  
05.06.12

**Sutter,Ben** *University of Central Oklahoma*  
05.03.52



**Swanson,Mark** *Tulsa Community College*  
05.03.89  
**Swanson,Zane** *University of Central Oklahoma*  
01.01.01  
**Swar,Bishr** *Northeastern State University*  
05.03.73  
**Sweeney,Sophia** *Northeastern State University*  
02.01.22

T

**Taher,Ibrahim** *University of Duhok*  
05.03.39  
**Taleghani,Zayn** *University of Central Oklahoma*  
05.03.87  
**Talkington,Anna Talkington** *East Central University*  
02.01.05  
**Tapia,Chelsey** *Northwestern State University*  
02.04.11  
**Tappert,Mary** *University of Central Oklahoma*  
05.05.13  
**Tatah,Canisia** *Southwestern Oklahoma State University*  
05.03.85  
**Tatum,Baylee** *University of Central Oklahoma*  
05.03.18  
05.03.52  
**Taylor,RaLyssa** *Northwestern State University*  
04.08.02  
**Taylor,Sara** *Northeastern State University*  
05.14.03  
**Taylor,Thomas** *University of Central Oklahoma*  
05.17.01  
**Teafatiller,Rebecca** *Southeastern Oklahoma State University*  
05.11.02  
**Tedford,Kinsey** *University of Central Oklahoma*  
05.03.03  
**Teigland,Tucker** *University of Central Oklahoma*  
05.08.14  
05.08.41  
**Telemeco,Rory** *University of Washington*  
05.03.21  
**Terdal,Erik** *Northeastern State University*  
05.19.09  
**Terrell,Leslie** *University of Central Oklahoma*  
04.09.04  
**Thapa,Manoj** *University of Central Oklahoma*  
05.13.19  
**Thomas,Dominique** *Cameron University*  
03.04.06  
**Thompson,Anna** *Northeastern State University*  
05.14.07  
**Thompson,Linzi** *East Central University*  
05.09.02  
05.09.03  
**Tibbits,Jeffrey** *University of Central Oklahoma*  
05.03.51

**Tinervia, Daniel** *Northeastern State University*  
05.03.90  
**Tinnin, Lauren** *University of Central Oklahoma*  
05.08.18  
**Toniâ€™ Osagie, Ehenedon** *Cameron University*  
01.04.07  
01.04.08  
**Topp, Ira** *University of Central Oklahoma*  
05.08.07  
**Torres, Alejandro** *Tulsa Community College*  
05.09.10  
**Towner, Rheal** *Oklahoma Medical Research Foundation*  
05.08.22  
**Trammell, Jetta** *Cameron University*  
05.03.96  
**Tran, Huyen** *University of Central Oklahoma*  
05.19.04  
**Tran, Thanh** *University of Central Oklahoma*  
01.05.06  
01.07.10  
**Tran-Pham, Anh** *Tulsa Community College*  
05.18.03  
**TRAXLER, Andrew** *University of Central Oklahoma*  
04.07.08  
**Trubitsyn, Denis** *Southwestern Oklahoma State University*  
05.03.92  
**Tucker, Leigh** *Cameron University*  
03.04.12  
**Turner, Michael** *Northeastern State University*  
01.06.11

## U

**Ubeidat, Muatasem** *Southwestern Oklahoma State University*  
05.03.85  
**Usher, Devin** *University of Central Oklahoma*  
01.03.02

## V

**Van, Lyly** *Southwestern Oklahoma State University*  
05.03.82  
**Van Den Handel, Cheryl** *Northeastern State University*  
04.08.07  
**Van Sant, Matthew** *Cameron University*  
05.03.96  
**Vanhoy, Mickie** *University of Oklahoma*  
05.17.01  
**Varney, Laura** *Oklahoma State University*  
05.18.11  
**Vassar, Matt** *Oklahoma State University*  
02.03.18  
05.18.03  
05.18.11

**Vaughan, Melville** *University of Central Oklahoma*

05.03.05

05.03.06

05.03.14

05.03.77

05.03.87

05.05.19

05.08.18

**Vega-Hughes, Carrie** *Northwestern State University*

04.02.05

**Vickers, Emily** *Tulsa Community College*

05.03.118

**Vickers, Samantha** *University of Tulsa*

05.12.02

**Vieira, Ingrid** *University of Central Oklahoma*

01.03.05

**Vital, Wanderley** *University of Central Oklahoma*

05.03.41

**Vo, Kevin** *Oklahoma State University*

05.08.26

**Von Bergen, Clarence** *Southeastern Oklahoma State University*

01.06.02

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

01.07.09

## W

**Waddell, Crystal** *Northwestern State University*

02.04.05

**Wagner, Nikolas** *University of Central Oklahoma*

05.08.10

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

01.05.06

**Walling, Jennifer** *University of Central Oklahoma*

05.03.56

**Wang, Kevin** *Northeastern State University*

05.03.17

05.03.44

**Wang, Yuxuan** *University of Central Oklahoma*

05.06.15

**Wang, Zihao** *University of Central Oklahoma*

01.07.11

**Ward, Kailyn** *Southeastern Oklahoma State University*

05.11.02

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

03.03.06

**Watie, Joshua** *Northeastern State University*

05.05.01

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

04.09.02

**Watkins, Kane** *University of Central Oklahoma*

04.05.01

**Waugh, Taylor** *Northwestern State University*

05.03.10

**Weaver, Austin** *Southeastern Oklahoma State University*

04.01.07

**Webb,Ariel** *University of Central Oklahoma*  
05.18.10  
**Webb,Jessica** *University of Central Oklahoma*  
05.03.87  
05.08.06  
**Webb,Keith** *University of Central Oklahoma*  
03.03.02  
03.03.05  
**Weeks,Lyndsey** *Northeastern State University*  
05.03.88  
**Weiherr,Matt** *Oklahoma State University*  
05.18.11  
**Wells,Harrington** *University of Tulsa*  
05.03.101  
**Wells,Joseph** *Northeastern State University*  
05.11.04  
**Wert-Gray,Dr. Stacia** *University of Central Oklahoma*  
01.02.06  
**West,Connor** *University of Central Oklahoma*  
05.08.01  
05.08.02  
**Westhover,Justin** *H.S. Homeschool*  
05.05.11  
**Whinery,Nicol** *Tulsa Community College*  
05.03.48  
05.09.10  
**White,Lacey** *University of Central Oklahoma*  
02.06.01  
05.12.01  
**Wickham,Jason** *Northwestern State University*  
05.05.36  
**Wigington,Amber** *Northeastern State University*  
05.17.26  
05.17.28  
05.17.29  
**Wilkinson,Erik** *Northeastern State University*  
02.01.06  
**Williams,Ashton** *Tulsa Community College*  
05.03.48  
**Williams,John** *Cameron University*  
01.04.07  
01.04.08  
**Williams,Richard** *Northeastern State University*  
05.07.02  
**Williams,Ryan** *Tulsa Community College*  
05.03.89  
**Williams,Wyatt** *Northeastern State University*  
05.14.08  
**WILLIS,GENNICE** *University of Central Oklahoma*  
01.07.13  
**Wilson,Haley** *Northeastern State University*  
05.14.07  
**Wilson,William** *USDA*  
05.05.13

**Wilson, Wyatt** *Tulsa Community College*  
05.03.118  
**Williams, Karen** *East Central University*  
05.16.01  
**Woods, Kristin** *Southwestern Oklahoma State University*  
05.17.21  
05.17.25  
05.17.30  
**Worthen, Kristen** *Cameron University*  
05.05.37  
05.05.38  
**Wright, Anna** *Oklahoma State University*  
05.03.97  
**Wright, Katelynn** *Cameron University*  
04.01.14  
**Wright Smith, Linda** *Cameron University*  
03.04.07  
**Wu, Nathan** *Oklahoma School of Science and Mathematics*  
05.05.31  
**Wu, Ning** *Southeastern Oklahoma State University*  
05.03.01  
05.03.02  
05.11.01  
05.11.02  
**Wu, Tina** *Oklahoma School of Science and Mathematics*  
05.05.27  
05.05.30  
05.05.31  
**Wurtz, Hunter** *Cameron University*  
05.05.20  
**Wyatt, Dr. Kippi** *Northeastern State University*  
02.03.03  
**Wyrick, Heather** *Southeastern Oklahoma State University*  
05.03.02

X

**Xiao, Xiao** *University of Central Oklahoma*  
04.04.02  
**Xiong, Han** *Cameron University*  
03.04.10  
05.06.31  
**Xu, Gang** *University of Central Oklahoma*  
05.03.71  
05.08.10  
05.08.11  
05.08.13  
05.08.18  
05.08.20

Y

**Yadav, Rohan** *University of Central Oklahoma*  
05.08.04  
05.08.05  
**Yarnell, Rachel** *Southwestern Oklahoma State University*  
05.17.25

**Yerton, Jacob** *Northeastern State University*  
05.03.100  
**Yoon, Kanghyun** *University of Central Oklahoma*  
01.07.08  
01.07.09  
**Youll, Lorry** *University of Central Oklahoma*  
02.01.07  
05.17.10  
**Young, Chelsea** *Muhlenberg College*  
05.03.117  
05.03.60  
**Yu, Nathan** *Oklahoma School of Science and Mathematics*  
05.05.32  
**Yueh, Hsin-I Sydney** *Northeastern State University*  
04.01.16

## Z

**Zachery, Shira** *University of Central Oklahoma*  
05.06.04  
**Zajac-McConaghy, Winifred** *University of Central Oklahoma*  
05.03.39  
05.03.52  
**Zang, Yushi** *University of Central Oklahoma*  
05.05.14  
**Zeng, Wenxi** *University of Central Oklahoma*  
05.06.12  
05.06.19  
05.06.20  
**Zhang, Hongkai** *East Central University*  
01.04.01  
**Zhao, Angela** *Oklahoma School of Science and Mathematics*  
05.05.31  
**Zheng, Link** *Oklahoma State University*  
05.03.103  
**Zhou, Feifan** *University of Central Oklahoma*  
05.08.02  
**Zhu, Lan** *Oklahoma State University*  
05.18.09  
**Zhu, Zhen** *University of Central Oklahoma*  
01.03.01  
**Zornes, Robin** *Northwestern State University*  
02.04.03

## OTHER

**Sun, Longji** *Oklahoma State University*  
05.08.39  
**(Cochran) Bradford, Brenda** *Northeastern State University*  
04.01.03