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2020

Guide Book

On behalf of Southwestern Oklahoma State University, welcome to the Twenty-First Oklahoma Research Day! We are proud to host students and faculty from universities and community colleges from across the state at this meeting of scholars. Research and scholarly activity ranging from Business Administration, Education and Professional Studies, Fine Arts and Design, Liberal Arts, and Mathematics and Science.

We are also honored for Dr. Bonnie Dunbar, a shuttle astronaut from 1985-1998, to join us as the Keynote speaker.

We wish to extend special thanks to all who played vital roles in making this event happen, particularly: Provost James South, for his continued support of research and scholarly activity at all levels; Mr. Scott Miller, Mr. Nate Downs, and Ms. Radonna Sawatzky, and their staff for helping to set up the facilities and providing catering services. We also recognize the faculty, staff, students, and administrative sponsors & collaborators who dedicate significant time and effort toward integrating students into various forms of research and scholarly activity. Also, a special thank you to those who volunteered their time to assist in the coordination of this year's Oklahoma Research Day.

A very special thank you to all of the sponsors who make Oklahoma Research Day a possibility. Without the contributions from the Oklahoma State Regents for Higher Education, the Oklahoma IDeA Network of Biomedical Research Excellence (OK-INBRE), the Established Program to Stimulate Competitive Research (OK-EPSCoR), Cameron University, East Central University, Northeastern State University, Northwestern Oklahoma State University, Southeastern Oklahoma State University, and University of Central Oklahoma, we

would not have been able to showcase the research excellence and accomplishments of Oklahoma's undergraduate students.

We would personally would like to acknowledge the members of the University Research and Scholarly Activity Committee for their dedication and hard work to make this event a reality. The members include Dr. Lisa Appeddu, Mr. Fredric Murray, Dr. Elaine Davies, Dr. Jared Edwards, Dr. Jeremy Evert, Dr. Denise Landrum-Geyer, Dr. Evette Meliza, Dr. Sophia Lee, Ms. Kim Zachary, Dr. Lori Gwyn, Ms. Jennifer Cook-Johns, Mr. C.J. Smith, Ms. Morgan Corona, and Mr. Aaron Cornell.

Student research is an essential ingredient in undergraduate education. It fosters collaboration, critical thinking, and creativity in identifying and working to solve a question, and it provides the opportunity to communicate results. From the student's perspective, there is the added excitement of potentially being the first to make a discovery, understand a problem, provide a solution, and/or make a creative contribution to the world. We hope you will continue to participate in events such as this in sharing your University's research and scholarly activity accomplishments – especially at Oklahoma Research Day.

Enjoy the Fair!

Sincerely,

SWOSU Office of Sponsored Programs

Contents

Business Administration.Accounting.02 - .03	1
Business Administration.Business.01 - .04.....	3
Business Administration.Economics.01 - .12	7
Business Administration.Finance.01.....	19
Business Administration.Information Operations Management.01 - .07	24
Business Administration.Management.01 - .05	31
Business Administration.Marketing.01 - .13	36
Education & Professional Studies.Education.01 - .22	45
Education & Professional Studies.Family Science.01 - .04	67
Education & Professional Studies.Health Studies.01 - .26.....	71
Education & Professional Studies.Nursing.01 – .08.....	97
Education & Professional Studies.Physical Education.01	105
Education & Professional Studies.Professional Teacher Education.01	106

Fine Arts & Design.Art.01 - .02.....	107
Fine Arts & Design.Design.01 - .06.....	109
Fine Arts.Multimedia Design.01 - .02	115
Fine Arts & Design.Music.01 - .02	117
Liberal Arts.Communication.01 - .15	119
Liberal Arts.English.01 - .36.....	134
Liberal Arts.Foreign and Modern Languages.01 - .04.....	170
Liberal Arts.History.01 - .18.....	174
Liberal Arts.Political Science.01 - .19	192
Liberal Arts.Sociology.01 - .10.....	211
Mathematics & Science.Animal Science.01 - .15.....	221
Mathematics & Science.Biology.01 - .87	236
Mathematics & Science.Botany.01 - .05.....	325
Mathematics & Science.Chemistry.01 - .56	330
Mathematics & Science.Computer Science.01 - .34	386
Mathematics & Science.Criminal Justice.01 - .10.....	420
Mathematics & Science.Engineering.01 - .34	430
Mathematics & Science.Environmental Science.01 - .08.....	464
Mathematics & Science.Forensic Science.01 - .02.....	472
Mathematics & Science.Genetics.01 - .05	474
Mathematics & Science.Kinesiology.01	479
Mathematics & Science.Mathematics.01 - .21	480
Mathematics & Science.Pharmacy.01 - .02	501
Mathematics & Science.Physics.01 - .10.....	503
Mathematics & Science.Psychology.01 - .25	513
Mathematics & Science.Statistics.01 - .11.....	538
Mathematics & Science.Zoology.01 - .04.....	549

Using the AICPA Examination Blueprints to Develop Decision-Based Teaching Objectives for Accounting Courses

Vanessa Winnie, Zane Swanson, & Edward Walker

Abstract

There is a “gap” between the accounting skills that accounting graduates know and what employers expect them to know. Consequently, there have been many calls for a more decision-based approach to teaching accounting. At the same time, the AICPA has converted its content specification outline for the Uniform CPA Examination into a series of Blueprints; additionally, it has introduced decision-based simulation questions into the examination.

Consequently, there is a need for financial accounting courses to actively incorporate decision-based learning objectives into curriculum and course syllabi. This study examines learning objectives in course syllabi from existing financial accounting courses and suggests ways to make them more decision-based and aligned with the CPA Examination Blueprints.

Accounting Conservatism and Debt Selection

Yinghong Zhang & Victory Ogunbanwo

Abstract

The amount of debt financing has significantly increased over the past decades. According to the capital market view from S&P Global Ratings in June 2018, the total debt of U.S. companies has reached a record of \$6.3 trillion. In addition, the proportions of different debt types vary over time. Rauh and Sufi (2010) show that about one-quarter of their sample U.S. public companies significantly change the composition of their debts even though their total debts stay the same. Therefore, an important research question arises to investigate which motives drive U.S. corporations to adjust their debt composition.

Accounting conservatism means that earnings reflect “bad news” more quickly than “good news” or the accounting rules “anticipate no profits but anticipate all losses” (Basu 1997). Accountants are motivated to require a higher degree of verification to recognize good news as gains than to recognize bad news as losses.

We examine the impact of accounting conservatism on debt structure (or debt selection). We predict that more conservative earnings reduce information asymmetry between borrowers and lenders and increase credibility of financial statements. Therefore, companies with more conservative earnings need less monitoring from creditors. These companies are more likely to borrow public debts than private debts. These companies also tend to use more senior unsecured and subordinated debts than secured debts.

ACADEMIC ETHICS AND FINNISH COLLEGE STUDENTS: AN EXAMINATION OF GENDER, AGE, AND EMPLOYMENT

Marty Ludlum

Abstract

The current project examines Finnish college students and their views on the academic ethics (cheating). Finland is an under examined population on this issue. In the current project, we surveyed students (n=153) in the spring of 2017. We found significant differences between students' attitudes on cheating based on several demographic factors, including gender, age, employment, marital status, and year in school. We conclude by discussing the implications for further research in this area.

Applying Classroom Teaching Techniques In The Online Environment To Improve Student Performance In Discussion Boards

Abidemi Olaoye

Abstract

Alongside the evolution of technology, distance learning is fast becoming a norm and has birthed many online programs. Demand for online programs is high because of flexibility for family and work, and the opportunity for students to work at their own pace (Thompson, 2006). Not only does it benefit students, it is also a financial success as “the US distance educator market is estimated at \$27 billion” (Docebo, 2018, p. 4).

Traditional classrooms emphasize the role of the teacher. However, online redefines the teacher relationship by shifting parts of the responsibility from teachers to students (Stoten, Oliver, O’Brien, & Swain, 2018). Instead of being the consumer of knowledge, the students are now expected to become co-creators. Hence, it is important that instructors design virtual classrooms that promote engagement and successful learning. One popular method is discussion boards which can be effective if students engage in the learning process (Aloni & Harrington, 2018). The challenge is to discover different ways to encourage engagement in discussion boards. To do this, it is important to consider the learning styles of students.

Learning styles refer to the concept that individuals differ in terms of what mode of learning is most effective for them. “VARK” measures three different learning styles including visual, auditory, and kinesthetic learning styles. Therefore, it is necessary to present materials in different formats so that each

The Impact and Uses for the YouTube Platform

Delarra Zangooei

Abstract

YouTube is the second largest search engine used on the internet, and the third most visited web site. With this much traffic, it's no wonder aspiring creators and companies flock to YouTube for opportunity. This research was done to study the viewing habits of users, and how creators and advertisers alike would influence the community. Since YouTube is as big a platform as they come, it's safe to bet most people have used it before, or regularly. A large demographic of the community is children; creators will cater to that audience as to reach higher viewership and attract advertisers and gain popularity. With so much community created content, it's evident that it is a threat to other entertainment businesses. The intention of YouTube usage positively affects consumers, motivating them with goals. We find that most of these hypotheses hold true as most consumers use YouTube as a source of Entertainment or educational purposes. The youth especially, is a demographic of high importance when it comes to creators and advertisers, even if content is above their age restriction. Depending on the usage type, we found compulsive YouTube usage leads to negative academic motivation.

One Size Does Not Fit All: Adaptive Learning Techniques

Suzanne Clinton & Alina Thomas

Abstract

As the education systems move toward providing personalized and customized learning to engage with each student, schools and universities started preferring adaptive learning techniques rather than the traditional method of teaching. Adaptive techniques provide paths and pace for learning which facilitates flexibility in the timing of completion and also determines the order and timing of course content. These techniques move away from one-size-fits-all learning and provides individual treatment for learners. Studies prove some variation between with- and without-adaptive learning techniques, and hence it is important to know the different learning tools, their features, and challenges faced. This poster will explore different adaptive learning tools and their impact on variables like retention rates, pass rates, and exam scores. The study concludes that these techniques have been successful in identifying the area the student is weak at and improves student engagement and time management.

Natural Disasters and Stock Market Responses of Regulated Utilities

Zhen Zhu, Kuang-Chung Hsu, & Tyler Nicholson

Abstract

In this study, we investigate the impact of natural disasters on the stock price of electric utilities. There appear to be more frequent occurrences of natural disasters with higher costs in more recent years exemplified by the wildfires in California. Electric utilities are regulated businesses and they can usually recover the costs associated with these natural disasters. However, there are several reasons why the values of electric utility companies can be influenced negatively. Among them are inverse condemnation laws in the presence of a natural disaster liability, added burden of investment to harden the grid, lags in cost recovery, lost revenue, uncertainty with rate case outcomes and so on.

We intend to document the market reactions to various types of natural disasters including wildfires, hurricanes, ice storms, earthquakes, and tornadoes. Utilizing the event study methodology, we calculate the abnormal returns and cumulative abnormal returns to gauge the magnitude of the impact of the major natural disasters on affected electric utilities, especially those utilities in states where frequent natural disasters occur. We are set to compare and contrast the market reactions after documenting them to further understand the market perceptions of the impact of various natural disasters.

Offshore Drilling: Effects to Local Communities

James Hackney

Abstract

In this study, I will research the effects that oil spills can have on local communities from offshore drilling. What I intend to bring from this subject is theories that oil spills can hurt the local economy. Places bordering the Gulf of Mexico, such as Alabama and Florida rely on the gulf for food and tourism. For example, how did the Deepwater Horizon spill affect the surrounding coast locations and what are some reputable effects from having such a “disaster”? I intend to provide evidence that these oil spills can hurt in the long run to these local communities.

After the BP oil spill, local residents felt the effects financially. There we 37,193 claims against BP for the financial loses local residents incurred. Based on a hearing with the Committee on Energy and Commerce, I will compile evidence of financial losses that local residents have incurred. Then I will provide an analysis of these losses to understand the characteristics of the losses in order to better understand how local communities have been impacted by these offshore drilling.

Oil Supply

Mart Gentry Barclay Cheatham

Abstract

The objective of this research is to econometrically detail the relationship of oil supply and demand. Oil prices have been decreasing. The working hypothesis is that oil is oversupplied to the market, decreasing price. The methodology to address the hypothesis will consist of applied analytics concerning data from the Energy Information Administration, the International Energy Agency, etc.

This research has vast implications for the Oklahoma economy due to its close ties with the oil market. An oversupply of oil makes drilling expensive wells, like hydraulic fracking, uneconomic. Additionally the jobs of many Oklahomans depend on the price that can be commanded by a barrel of oil.

Load Forecasting for Oklahoma Gas and Electric

Mart Gentry Barclay Cheatham

Abstract

I show the analytics and process of forecasting electricity demand for Oklahoma Gas and Electric. Energy demand data (Load MW) was collected from the Southwest Power Pool. Data from 2015 - 2016 were used as a training set to forecast demand for the year 2017. In this research, I will use pure time series models such as ARIMA and TBATS as well regression models.

Theory and preliminary evidence suggest that there is a strong correlation between temperature data and demand. However, in order for temperature data to work, we will need to transform the temperature data into Cooling Degree Days and Heating Degree Days. I will go through the modeling process to demonstrate how we can successfully model the demand using these temperature data as well as economic information.

This research appears to have practical importance as utilities need to schedule electric production to make sure demand is met by supply such that no blackout will be generated by lacking of sufficient planning.

Oklahoma Electricity

Mart Gentry Barclay Cheatham

Abstract

To examine electricity in Oklahoma, data from the Energy Information Administration was sorted based on operable generators in Oklahoma. The data suggests that natural gas is the dominant energy source in Oklahoma at 47% of total capacity.

Renewable and non-renewable energy sources in Oklahoma were compared.

Renewables are more responsive to current market conditions. Renewable energy, in Oklahoma, is competitive against non-renewables. For example, energy from onshore wind turbines, solar photovoltaic, and conventional hydroelectric generators have very little to no startup time. Whereas non-renewables have a considerably longer startup time.

Renewable energy sources make non-renewables less competitive by nature. Renewable Energy sources are particularly competitive in that they take demand from non-renewables which forces these plants to operate at a lower output level, making them less money. To compensate, the more invariable plants close due to being unprofitable and unable to keep up with the market. Coal may be cheap, but it is less variable.

As a statement of fact, renewables are more efficient than non-renewables year-round. As a measure of the seasonal power factor in Megawatts divided by the nameplate capacity, during the summer, renewables like Hydroelectric and Wind Turbine power have perfect efficiency, which is about 20% more efficient than coal, and 9% more efficient than natural gas in an internal combustion engine.

OIL AND GAS EXPLORATION AND PRODUCTION WASTE MANAGEMENT

Bebe Jessica

Abstract

Over the past decades, the activities of exploration and production of oil and natural have considerably increased due to technological advancement in drilling and exploration. As the byproduct of these oil and gas activities, drilling and extraction wastes have been generated in a large amount. Those wastes include produced water, drilling muds, acid water, drill cuttings, basic sediment, and servicing fluid. The drilling and exploration wastes can damage our environment if not dealt with appropriately. Many states also provide regulations to guide these activities. Our project intends to look into.

Factors Affecting the Variation of Gasoline Prices and the Effects of it

Eng Kit Ooi

Abstract

In this study, I will attempt to investigate the factors that are affecting the variation of gasoline prices at gas stations. It seems that gas stations across the United States sell their gas at different prices even though they are of the same grade. That being said, one of the issues I will address in this research include the reason why gas may be cheaper across the street. Several factors that could potentially affect the variation in gas prices includes state taxes, fuel regulation, location of the gas station, the volume of gas retailers carry, fuel brand as well as location competition.

I also intend to look into the economic aspects of things by looking at the earnings of gas stations. I will distinguish whether gas stations generate more of their money from selling gasoline or from basic essential goods in-store. I will also look into the survival risk of a gas station. I will document my findings and determine if gas stations can survive if their competitors across the street are selling gasoline at a cheaper price. Lastly, I will also attempt to determine the main factor that attracts customers to a particular gas station. I will use data and statistical models to discuss if price is the main determinant to why a customer selects that gas station.

This study is expected to prove that gasoline prices are not the driving factor to a gas station's success.

BENEFITS AND HARMS OF ELECTRIC RETAIL CHOICE

Bebe Jessica

Abstract

Since the mid '90s, electric deregulation has taken hold in several states throughout the U.S. In order to have a better vision of the before and after of deregulation, it is important to understand the concept of energy deregulation. Deregulation of the electric market is the process by which states allow various autonomous electric providers to compete with one another to supply energy to residents, rather than one utility company dominating the entire electric market.

Throughout this project, I will try to understand the incentives behind deregulation or the series of events that caused some states to switch from regulation to deregulation, and weigh the pros and the cons. The particularity of this project is that it will suggest some strategies that could have been executed to avoid the market manipulations performed by Enron who played a major role in the history of deregulation.

The Future of Natural Gas Price: In the U.S.

Devon Smith-Dunn

Abstract

The purpose of this paper is to get a better understanding of what natural gas prices will look like in the future. In order to do so, we must look at the major factors in determining price. Natural gas and electricity prices are highly correlated since gas is primarily used in the generation of electricity. Natural gas has become a favorite in the electricity market because of its low carbon dioxide emissions and is known to be the cleanest of the fossil fuels. As the demand for electricity ebbs and flows, so will the demand for natural gas. We will examine the demands for electricity as it will greatly impact the prices that natural gas brings. The demand for electricity is con growing. Weather temperatures greatly impact the demand for electricity (heating and cooling) and is hard to predict. As more electricity is needed (demanded) the more natural gas will be needed to help fill this demand. We will study, briefly, the temperatures of now and what can reasonably be expected in the future. Demand from other countries (exporting) will be another factor we will look at. As emerging economies, and developed ones, become over populated or in need of more electricity generation they will look at natural gas as a player in filling this gap. Up until late 2017 (early 2018), the U.S. was a net importer of natural gas, but things shifted as the U.S. market became oversupplied with natural gas as a direct result of fracking/drilling. We will study the production of natural gas.

Possible Variables Affecting Sales of Tesla Vehicles

Eng Kit Ooi

Abstract

This research will critically examine the variables that affect the sales of Tesla car and attempts to forecast it based on previous years data. Several factors that could potentially affect the changes in the sales volume of Tesla vehicles such as disposable personal income (DPI), gasoline price (GP), price of electricity (EP), and population (P) are of interest.

The justifications for each variable are: Disposable personal income is of importance since motor vehicles are goods that require a large amount of capital to invest in. Economic theory suggests that more income results into higher spending on all goods including Tesla Cars (assuming Tesla cars are also normal goods) i.e., increase in sales. Price of gasoline and price of electricity were selected as predictors in the model since Tesla vehicles do not require fuel to operate and any change in gasoline and/or electricity prices could potentially affect Tesla sales. The last independent variable in the model is the population. The justification here is that when population is high, there should be more sales of automobiles vehicles (and the opposite is also true).

The results potentially suggest that price of gas and price of electricity are the main driving force for the car sales of Tesla. The research will determine the goodness of fit of the predictors for the model. Statistical models and data will also be used to determine the impact of each predictor with respect to the car sales.

To Burn or Not to Burn? The question of Natural Gas Flaring

NICKROOZ NEKOUI

Abstract

Extraction of oil is often accompanied by the production of associated gas - a byproduct of the oil production. In many cases, these associated gas is flared or burned. Flaring is the process by which natural gas is burned off in a controlled manner when extracting oil. Flaring gas or not is an economic decision. In instances where the amount present along with oil is minimal and would be of no benefit, gas is brought up and burned off. Further, due to the low price of Natural gas, it's not economical to build the necessary infrastructure to capture it; doing so would result in a negative return. In addition to economics involved in this flaring process, environmental concerns is usually another issue involved. Instead of methane (natural gas is primarily methane) going up to our atmosphere, Carbon dioxide is released instead after flaring, which is a less detrimental element in comparison to other greenhouse gasses like methane. However, what would the effect on our oil and natural gas industry if we were to capture all these minuscule amounts that we end up just burning off? This is where my research takes place. In my research, I intend to first discuss pros and cons of flaring. In addition, I will present evidence on amount of gas flared for different oil/gas producing states. In addition, I will examine the environmental effect of the gas flaring by exploring the data on greenhouse emissions. A related issue is the state policies regarding gas flaring.

Recycle Drilling Waste

Hector Bullock

Abstract

For this research study, we explain the process of disposal, treatment, and future state policies for recycling drilling waste. There are three types of drilling mud: water based, oil-based, and synthetic based mud. Current traditional disposal companies are not following legitimate recycling criteria that is required by the U.S. EPAs for the disposal of this mud waste. There are multiple methods to undergo a pre-treatment filtration. Research found different contaminants in the mud that undergo separation during the filtration and recycling process. Recent recycling policies and new concepts of use after the filtered drilling mud has come to be complacent during testing for approval to recycle the drilling mud, therefore easily manipulated to pass regulatory tests. Our study is set to compare and contrast the multiple methods of recycling drilling mud, while exposing regulation faults during testing phases. Research should show alternatives for future applications for drilling mud after recycling.

Lawsuits and its effect on companies' stock prices.

Daria Khmelova

Abstract

Objective of the research: The objective of the research is the study of lawsuits, legal settlements and their effect on companies' stock prices in different industries.

Thesis or hypothesis: Lawsuits and legal settlements do not affect trustable publicly traded companies in the long run.

Methodology or approaches: The research was conducting with the help of historical data. The stock price was compared before and after public announcements regarding lawsuits. University of Central Oklahoma (UCO) library's databases were used, as well as famous TV reporters - The Wall Street Journal, Bloomberg, Yahoo Finance.

Summary of the findings: The research proves the theory that the companies' stock prices are not affected by the legal cases in the long run and they recover during the first 1 to 5 years. Some fast-growing companies are not affected by legal settlements at all, some of them recovered in less than a year as long as they have a high growth rate, popularity and developing brand name. The perception of companies plays a major role. Thus, the legal settlements of companies in finance industry affect company's stock negatively and take more time to recover. While companies that manufacture apparel are slightly affected by lawsuits and are more likely to recover the stock price within the year.

THE INFLUENCE OF PEER MENTORING: A GUIDE FOR FIRST-YEAR BUSINESS STUDENTS' ACADEMIC STUDIES AT THE UNIVERSITY OF CENTRAL OKLAHOMA

Nathan Tayero

Abstract

Peer mentoring is a form of mentorship that usually takes place between a person who has lived through a specific experience (peer mentor) and a person who is new to that experience (the peer mentee). The review of literature on peer mentoring explores the benefits, application and what a peer mentor is. This study focusses on identifying the qualities of a peer mentor that a student seeks. This research also seeks to identify ways on how to find a peer mentor who can aid them during their time of studies in the College of Business at the University of Central Oklahoma. Using the survey method, data will be obtained from students to learn about the qualities which students would like to see in a peer mentor. The questionnaire also seeks to identify the various ways students use to find a peer mentor.

An Analysis of Project Management Requirements for Data Analytics

I-Lin Huang

Abstract

Numerous projects of data analytics have been initiated in business areas each year. The projects of data analytics integrate and transform big data into insights. In the end, the insights generated by data analytics are expected to help organizations to gain competitive advantages by, for example, predicting customer trends and behaviors, and/or increasing business productivity.

However, it was reported that around 85% of the projects of data analytics would fail by the end of 2017. Various causes of failure have been discussed in the literature. However, there is no systematic organization of the causes of failure to help project managers of data analytics to avoid making the same mistakes in the future.

This research study used content analysis to investigate the causes of failure of the projects of data analytics in literature. Then a three-sphere model for systems management is chosen as the framework to categorize the causes of failure. Finally, a framework of causes of failure is proposed as the project management requirements for the success of a project of data analytics.

Does the Remote-Control “Control” Our Future?

Selena Romero & Ashley Salim

Abstract

In generations past, a remote control was merely the consumer manually turning a channel on the television. The concept of using an actual remote device to change a channel revolutionized the television industry and unlocked other uses of a remote device. This research explores the advancements of remote-control technology and tries to determine the direction of device usage in the future. Specific focus is placed on the dependency of repeated use and the variety of devices utilized, predicting phones are replacing all remotes in general. Also, do people prefer to search for a lost remote rather than use the appliance, even if it is closer? Would consumers be highly frustrated by not having the convenience of a remote? The methodology of this research was an online survey of random college students, faculty and a variety of professional participants, conducted over a three-week period. In concurrence with the survey, research data and published articles pertaining to this study were collected and reviewed. Research results indicate a clear pattern of predictable increased remote-control reliance.

The Impact and Uses for the YouTube Platform

Delarra Zangooei

Abstract

YouTube is the second largest search engine used on the internet, and the third most visited web site. With this much traffic, it's no wonder aspiring creators and companies flock to YouTube for opportunity.

This research was done to study the viewing habits of users, and how creators and advertisers alike would influence the community.

Since YouTube is as big a platform as they come, it's safe to bet most people have used it before, or regularly.

A large demographic of the community is children; creators will cater to that audience as to reach higher viewership and attract advertisers and gain popularity.

With so much community created content, it's evident that it is a threat to other entertainment businesses

The intention of YouTube usage positively affects consumers, motivating them with goals.

We find that most of these hypotheses hold true as most consumers use YouTube as a source of Entertainment or educational purposes. The youth especially, is a demographic of high importance when it comes to creators and advertisers, even if content is above their age restriction. Depending on the usage type, we found compulsive YouTube usage leads to negative academic motivation.

An Examination of Factors Affecting Online Video Streaming

Mart Gentry Barclay Cheatham

Abstract

We examined the users of online video streaming services. We wanted to discover what age groups primarily used video streaming services, which video streaming services are most popular, and the reasons people use online video streaming. We hypothesized that those who are 18-24 years old use streaming services most. Our hypothesis also predicted that Netflix is the most popular streaming service based on its Netflix Originals. Qualtrics survey links were given to respondents, 106 participated. The data suggests that Netflix is a dominant player in the market. Respondents were primarily 18-24 years old and two-thirds were women. Additionally, majority of respondents indicated that viewing options and convenience primarily influenced their choice of streaming service. There were three "other" responses to the streaming service question, the others were VRV and Sling. It appears that streamers typically watch five or fewer hours of video per day.

Is Click and Collect an effective strategy to implement to increase consumers' willingness to buy?

Taylor Patry

Abstract

As the market becomes more competitive, companies develop new technologies to attract customers. For instance, retailers, such as Amazon, Walmart, Kroger, etc., recently introduced “Click and Collect”, which gives customers the convenience of placing orders online and picking them up in store (Haddon, 2018). This service has become popular among consumers, and even has become a “basic expectation of shoppers” (Bond, 2018), who are interested in micro-shopping trips, i.e., less than five-minute visits to the store (Pearson, 2018). It allows the retailers to better compete against rival companies, reduce delivery costs (Haddon, 2018) and extend their product offerings via complementary services such as promotional alerts, product suggestions, and inventory reminders (Pearson, 2018). However, the implementation of this service may negatively impact in-store traffic (Baird, 2018), and potentially, the overall revenues of the stores. To better understand the tradeoffs that retailers are facing when implementing this innovative technology, this research investigates how consumers make purchase decisions having this option available to them. Specifically, in the first study, I investigate the moderating effect of product types on consumers' willingness to buy with the Click and Collect service. In the second, I explore how consumers with different levels of technological fluency are willing to adopt this service.

The JavaScript or jQuery Dilemma - What to Use

Bill Rosener

Abstract

JavaScript is a client-side scripting language for Internet browsers. It allows for interactive and dynamic elements on a web page. This could include listening and reacting to various user input. jQuery is a JavaScript library that makes it easier for developers to create interactive websites without having to write as much code. This is thanks to the pre-written code packaged up in jQuery. It would seem that using jQuery is a no-brainer?

This poster presentation will compare and contrast the time to develop applications using JavaScript and jQuery. It will also focus on software engineering. How easy is for other people to read and modify someone else's code.

Performance Orientation versus Learning Orientation and its Effect on Organizational Ethics

Brayden Battershell

Abstract

The mindset of an organization and its people can have a huge impact on the ethics and decision-making of that organization. The purpose of this paper is to see the power of mindset when it comes to ethical decision-making. Specifically, it will focus on performance orientation and learning orientation and how they compare to the fixed and growth mindsets, which is the research of world-renowned Stanford University Psychologist Carol S. Dweck. A performance orientation reflects the extent to which a community encourages and rewards innovation, high standards, excellence, and performance improvement. A learning orientation is the tendency or habit of seeking to increase one's knowledge and skills; toward valuing the learning process to accomplish mastery over a task; toward being interested in challenging activities; and toward using information seeking as a personal strategy when problems arise. My hypothesis is that companies that have this performance orientation are more likely to make unethical decisions in order to achieve the desired results and have a good performance. Likewise, learner-oriented companies are more likely to make ethical decisions because these companies are focused on growth and learning, not on the results. To support this hypothesis, this paper will examine three companies who have famously been labeled as an ethical or unethical organization because of certain business decisions, and I will see how their mindset each contributed to those decisions.

Supervisor-subordinate relational mentoring episode

Hongguo Wei

Abstract

This paper aims to understand supervisor-subordinate relational mentoring that addresses short-term challenges and learning needs. With 5 separate studies, the author develops the scale of supervisor-subordinate relational mentoring episode (SSRME), including three dimensions: empathic initiation, conversational cultivation, and developmental enhancement. Empirical results from multi-source data show that SSRME impacts employee job performance and leader effectiveness through the mediation of leader-member exchange.

Cannabis in the Workplace

Destiny Waller

Abstract

With new state legislation regarding cannabis (“marijuana”) being enacted in 2019, Oklahoma human resource (HR) professionals are implementing policy changes in order to comply with new state regulations. Oklahoma Medical Marijuana and Patient Protection Act, known as the “Unity Bill,” allows physicians to prescribe medical marijuana and restricts employers from taking action (including refusing to hire, discipline, discharge or penalize) against applicants or employees solely based on their status as a medical marijuana license holder or because of a positive drug test. While Oklahoma, as well as 45 other states, have begun to legalize the use of cannabis for medical and non-medical (recreational) purposes, federal law (including The Controlled Substance Act 1970) continues to maintain and classify marijuana as a Schedule I substance and deeming the consumption, possession and production of marijuana as illegal. Our qualitative research objective was to examine how HR practitioners and organizations were reacting to recent cannabis regulation changes. Legislative changes have resulted in HR managers to (1) reevaluate organizational drug testing policies to include defining being “under the influence,” and (2) clarify policies related to “safety-sensitive” positions and performance testing.

Using Rate My Professors Data to Develop More Effective Faculty Development Programs

Amanda Evert, Shelby Trawick, Jonna Myers, & Clark Kurtis

Abstract

With higher education becoming more student-focused, colleges and universities are placing more importance on student feedback (Steyn, Clint, & Sambo, 2018). When higher education institutions request this feedback, many may focus on quantitative responses - ratings, Likert scales, etc. However, these quantitative studies neglect a substantial amount of data presented in the form of qualitative responses. Qualitative feedback can help institutions develop better ways to increase the quality of education provided.

While individual professors may seek out tools to develop their teaching independently, research shows that introducing faculty development programs (FDPs) at the institutional level promotes stronger instructional practices (Bilal, Salman, & Songsheng, 2019; Roberts, et al. 2019). A meta-analysis conducted by Bilal, Salman, and Songsheng (2019) reveals that FDPs create a “significant and positive impact” on faculty competence. Additionally, a second study by Roberts, et al. (2019) displays that student evaluation scores increased after the implementation of FDPs.

A scrape of Rate My Professors’ data shows that certain qualities are more prevalent in the 4- to 5-star quality categories than anywhere else: Gives Good Feedback, Caring, Respected, and Amazing Lectures. Using this information, this study aims to provide guidance and insight into the strategic design of FDPs that can increase the quality of higher education at the state and nation

A Theory of Strategic Stakeholder Emergence

Lincoln Brown

Abstract

Firms are facing heightened demands to include multiple stakeholder perspectives in their strategic management practices (Filatotchev & Nakajima, 2014; Nason, Bacq, & Gras, 2018) in order to achieve sustainable advantage. Stakeholder management is an inclusive strategy implemented to address the needs and concerns of a broad array of stakeholder groups. The depth and breadth of extant stakeholder research bolsters the notion that stakeholder concerns merit strategic attention and management, yet to date, the genesis of stakeholder management has been under theorized and under developed as a function of the entrepreneurial process. While generally regarded as an extant self-sustaining organism, we contend stakeholders exist only in relationship to the firm. Without the firm, there are no stakeholders, and without the entrepreneur, there is no firm.

We develop a framework incorporating stakeholder emergence within the entrepreneurial process. The entrepreneur, as the bearer of uncertainty in exchange (Bylund & McCaffrey, 2017) ultimately determines stakeholder clout through entrepreneurial choices, which are formulated over time. Choices ultimately reflect the Adam Smith notion of The Invisible Hand, where exchange must be mutually beneficial in order to sustain the entrepreneurs' individual subjective well-being objectives (Smith, 1776). What makes a stakeholder a stakeholder? In our framework it is the entrepreneur.

Exploring How Research Engagement Influences Career Mobility among Diverse Student Scholars Alumni

Zoie Hing, Karen Anderson, Mindy Vo, & Jeanetta Sims

Abstract

Diverse Student Scholars is a program that provides student research engagement opportunities targeting women and people of color. Through 20 interviews with the program's alumni, this project explores how undergraduate research engagement influenced their career mobility, which has not yet been explored in this undergraduate research program. Understanding career mobility will assist students, faculty, and program directors in marketing the value of research engagement to students and to potential employers.

Exploring the Impact of Diverse Student Scholars on Career Transferable Skills Development among Alumni

Jeanetta Sims

Abstract

Diverse Student Scholars provides research engagement to women and people of color at the University of Central Oklahoma. Through 20 interviews, this project explores career transferable skills among Diverse Student Scholars alumni, which has not yet been examined in undergraduate research. Exploring the impact of career transferable skills will provide students and faculty an understanding on the importance of undergraduate research and communication skills in future professions.

Exploring Post Baccalaureate Impact of Research Engagement among Diverse Student Scholar Alumni

Jeanetta Sims

Abstract

Diverse Student Scholar Research Engagement is the process of preparing the student for post baccalaureate existence, enhancing the students cognitive, affective, and behavioral skills, related to research and professional career preparation. This study will show how research engagement has impacted the diverse student Scholars personal and professional lives, post-graduation. Revealing nurtured skills that have released abilities to interact and work with people whose backgrounds are different from their own, and why is this important.

The Effect of LGBTQIA+ Support on TTRPG Companies' Social Media Engagement

Dillon Martone

Abstract

Since their first bout of popularity in the 1980s, tabletop roleplaying games (TTRPGs) have been notorious for attracting, advertising toward, and being gatekept by a specific demographic: straight men. However, in recent years, TTRPGs have enjoyed a secondary boom thanks to a combination of a simplified ruleset, popular podcasts, and the progressive policies and expanded target clientele of companies like Wizards of the Coast, who produce Dungeons & Dragons. Through analyzing the pro-LGBTIA+ social media content of Wizards of the Coast and its competitors, it can be determined if supporting this community has had a positive, negative, or alternative effect on their engagement and the perception. Given the company's recent pivot toward inclusivity and expansion of its customer base, it can be expected that catering social media posts toward a marginalized community hungry for representation will increase its net engagement (likes, reposts, and comments) as well as positively affect its reputation. Specifically, Twitter will be used as the basis for recording the social media data, and each company's June (Pride Month) posts from each year dating back to the respective account's creation will be analyzed and sorted by amount of likes, re-tweets, and comments. The conclusions drawn from this research can assist companies in the industry with identifying gaps in their representation as well as bring awareness to a trend that can affect profits and the size of a

Evaluating the Marketing of Triad Fitness Supplement Nutrition: A Comparison between Social Media Target Audiences

Chavan Sampley

Abstract

Triad Fitness Supplement Nutrition is a supplement shop located in Northwest Oklahoma City with a mission statement to fulfill their customer's potential. They strive to educate customers with their National Academy of Sports Medicine certified employees by implementing meal plan advice, workouts, and supplement guidance. Their target audience ranges from youth athletes fulfilling their potential to elderly citizens looking to improve their health. The key to reaching Triad's ideal target market may lie between reaching their Facebook and Instagram audiences. We will inspect previous posts to analyze likes, shares, views, and comments to help improve both their Facebook and Instagram marketing. After conducting an in-depth evaluation, we will demonstrate what improvements could help Triad communicate with their current and potential clients throughout both social media formats. This will not only be applicable to Triad, but other local businesses and baby boomer generation to have a better grasp on using social media to reach their prospective clients.

Instagram Marketing in the Wedding Venue Industry

Katrina Wichert

Abstract

In the last decade, the wedding industry has been growing more popular and profitable, a huge reason being social media. Southwind Hills, Rosemary Ridge, and Spain Ranch are three examples of successful wedding venues in Oklahoma. The different marketing strategies each venue uses on their Instagram accounts can be evaluated to determine which types of posts are most successful. General engagement and captions are variables that determine how new posts do. Many people use Instagram to chronicle their lives and a large part of their lives could be a wedding. Knowing potential venues can increase interest, showcase different wedding styles, and determine reputation. This research can be used for both new and old wedding venues alike, as well as other vendors in the industry, by potentially increasing profits, clientele, brand, and popularity.

Soda Companies Market Water and Tea: An Instagram Content Analysis of Beverage Marketing

Madison Boothe

Abstract

Pepsi and Coke have brand extensions in traditional soda, water, and tea product categories. The Instagram marketing tactics for their six specific products are beneficial to the company's water base. Pepsi, Aquafina and Gold Peak are brands owned by the Pepsi Company. Coke, Dasani, and Pure Leaf are competitor brands owned by the Coca Cola Company. Analyzing Instagram posts of three competing products from each brand can predict future engagement numbers and consider factors that impact brand loyalty. Comparing brand performance using engagement as a common trait can determine which brand and product are most popular. The data derived from these calculations will support predictions relating to bottled water marketing strategies and how brand loyalty might affect outcomes. This study provides information that can be used to improve Instagram marketing for companies that already offer brand extension products or are considering new product offerings.

College Students Fighting Hunger

Raven Cabrera

Abstract

A group of students conducted a feasibility regarding an on campus Food Pantry at Cameron University to address the problem of food insecurity among students. The study resulted in a partnership with a local food bank to provide services for students in the area. The ramifications of food insecurity include poor academic performance and students unable to persist in their college education. This presentation shares the results of this project with an emphasis placed on the utilization of writing and communication skills to convince administrators and the community to endorse the project.

Effective Promotional Strategies That Increase Adoptive Homes For Teens In Foster Care: A Guide For Future Initiatives.

Cameron Herrera

Abstract

More than 100,000 children in foster care need to be adopted or have yet to find a suitable and loving home. Our goal is to find the best marketing procedure to better the chances of teens being adopted. There are three different type of adoption recruiting methods. Child specific is a method used for seeking out a family for a specific child. General recruiting methods are mainly based on the public and focus on needs of adoptive families. Target recruiting methods focuses primarily on “adolescents of Hispanic youth.” Our group has decided to look into National and State campaigns using specific promotional strategies. We measured which promotional strategies have worked most effectively that could better and increase teen adoption from foster care. The “General” adoption recruiting method has become most effective especially when it is used by local marketing platforms such as social media. We are going to take an over look at promotional strategies that have increased awareness, overcome stereotypes, and ultimately increased the number of teen adoption from foster care based on these specific promotional strategies. No child should grow up without a family and our goal is to increase awareness and help solve the problem of teens aging out of foster care without a family by showcasing and highlighting effective promotional campaigns.

Application of Consumer Perceptions on Printed Media Campaigns Promoting Healthy Eating in Cafeterias

Shelbey Trawick

Abstract

This literature review studies the effects and consumer perceptions of printed media campaigns on promoting healthy choices in different cafeteria settings. The American College Health Association reported that the number of overweight and obese undergraduate students increased by seven percent from 2010 to 2015. This statistic became the basis of many studies that examined the effectiveness of different promotional strategies on food choices in cafeterias. Three primary healthy eating campaigns were highlighted in the literature: traffic light labeling systems, choice architecture, and healthy eating plate diagrams. While research findings suggested these campaigns did not appear to have a significant effect on food choice, the limitations discussed in the studies - along with feedback supplied by surveys and focus groups - provide insight into how to best implement similar printed media campaigns without patronizing students or losing the purpose of the promotional strategies. The findings of this literature review will be used to implement a media campaign at Southwestern Oklahoma State University to promote healthy eating choices on campus.

How Social Media (Facebook) Affects the Impact of Real Estate Bubble on Home Ownership Cost in India and Dubai

Ali Musaqlab

Abstract

The real estate bubble has affected housing prices in both Dubai and India. The prices went so high in recent years to a level that they cannot be supported anymore. Factors that may have contributed to this include high demand, high dispensable income, and rapid economic development. Our company, Rocky Properties, relies on Facebook as a social media platform for marketing. This tool allows us to position the company better because they serve the purpose of creating a bond with the target market through the creation of the necessary trust. This research study seeks to establish how Facebook as a social media marketing tool plays a role in the influence of the real estate bubble on the cost of homeownership for Rocky Properties in the two regions - India and Dubai. Facebook has increased our company's visibility. This is achieved through the use of Facebook business pages to share pictures of the houses on offer for the customers. The managers can gather consumer information that can be used in pricing. Also, information from potential buyers will help in generating key messages that will attract home buyers and fight off price competition. The platform provides reliable means to engage with the customers personally through the comments section rather than the use of automated messages. This creates an environment of trust between the clients and the seller.

(Inter)National Basketball Association: A Case Study of NBA India's Instagram Marketing The National Basketball Association (NBA) has the strategic plan to expand the game globally.

Madison Woods

Abstract

Specifically, Commissioner Adam Silver is pushing for growth of the NBA brand in India. The NBA, just this preseason, hosted a game, community events, and other activities within the country. We are investigating the difference of activity of the NBA and the NBA India pages on Instagram. The followers of the pages are massively different, with the NBA having 44.2 million followers and the NBA India page having just 233,000 followers. Given that there are more than 1.3 billion people in India, this appears to be a very small portion of the possible target audience. With the start of the pages only being a year or less apart, NBA India is posting around 2.5 times less than the NBA. Part of the low number of Instagram followers could be the relatively low number of posts shared on the Indian Instagram page. Investigating differences in types of posts and viewer interactions may provide a better understanding of new tactics that could be employed on the NBA India Instagram page and help Adam Silver achieve his goal. Although we do need to consider that the NBA page is not exclusive to the US alone, conducting this research will benefit both the NBA and India by growing the popularity of the amazing sport of basketball.

Evaluating the Facebook marketing campaigns of Lucky Star Casinos in Oklahoma

Samantha Waterman

Abstract

Lucky Star Casino has six locations throughout western Oklahoma. Social media has become a big resource for boosting advertisement and marketing for businesses.

The objective of this research is to analyze Lucky Star Casino's Facebook pages to show a comparison between promotional advertisement and customer testimonials.

The content analysis will cover the promotions advertised from October through December of 2019 as those are considered the biggest holiday months of the year. It will compare interactions between advertisements posted and the testimonials that follow on the same day or week.

Results will show which promotions significantly increase engagement, and which promotions have the tendency to lower engagement.

In the end, this study will provide strategies on how other casino social media administrators can better compose social media content to improve engagement, to better market their offerings, and to increase the reach of their posts.

Language, Categorization, and Literacy: A Study of Skills in Deaf and Hard of Hearing Students

Erin Swanson-Shepherd

Abstract

Categorizing the world is one of the very first steps in language acquisition, and most of the time it is implicitly learned. Children who are deprived of language due to being deaf and hard of hearing are not receiving this implicit learning.

It's been theorized that depriving a child of language has profound effects on ability to read. My study will attempt to show further connections in language, the ability to categorize the world using language, and how it affects the ability to read.

The purpose of this study is to explore language usage, delays and other factors in deaf and hard of hearing students. The study seeks to answer the following research questions: how does a potential language delay in deaf and hard of hearing students affect their ability to categorize?

How does a lack of categorization skills affect the literacy skills of deaf and hard of hearing students? The goal of this literature review is to synthesize research existing in language delay in deaf and hard of hearing students, and categorization skills linking to literacy. There are gaps in research to be answered through this review regarding language acquisition, categorization in deaf and hard of hearing students, and the potential literacy impacts that categorization can have on this set of students.

Parenting in Prison: A Qualitative Case Study Regarding Incarcerated Mothers

Kimberly Phillips

Abstract

Do the crime, do the time: this saying is familiar in the decades of America's mass incarceration. Millions of children are suffering from their parent's prison sentences (Annie E. Casey Foundation, 2016). It is not the children's fault, yet they suffer the most when a parent is incarcerated. Children are struggling to function in society with a mother in prison. For example, mothers have their own challenges such as treating mental illness, dealing with addictions, and worrying about who is taking care of their children; which may impede their role as a parent and add a further negative impact on their children (Storm & Storm 2011). Despite the negative long-lasting impacts on children, there are limited studies available on parenting in prison. Thus, the present study examined parenting experiences of incarcerated mothers while they are in jail: their feelings about, contacts, and relationships with their children. Through an in-depth semi-structured interview with 17 mothers in prison enrolled in a college level parenting class at a Midwestern State Women's Correctional facility, were asked to share their story of parenting in prison. A qualitative approach was taken in order to understand how mothers soon to be released from prison felt about their current parenting practices and if they could end the intergenerational incarceration cycle.

Are Classroom Libraries Necessary? Student Voices from First-grade students through High School Students.

Amy Vejil, Eileen Richardson, Cheryl MacGregor, & Lindsay Orourke

Abstract

Student teachers will present their findings on opinions and attitudes towards the classroom library from the perspective of the students in their mentor's classroom. Questionnaires were given to students within their student teaching classroom to explore their perception of the classroom library or lack of one. This research explores the need for a classroom library from the perspective of a student within each grade level. The research explores design, usefulness, and reading engagement through the lens of those students in the classroom. This study brings a level of awareness to future and current teachers on the literary needs of classroom students from first grade to high school students.

An Analysis of Publication Trends in Orthopedic Residents in Relation to Academic Achievement Post-Graduation

James Hobbs & Marvin Carr

Abstract

Authors: Marvin Carr, BS1, J. Michael Anderson, BS1, James Hobbs, BS1, Corbin Walters, BS1, Austin L. Johnson, BS1, Matt Vassar, PhD1

Background:

Continuing Medical Education (CME) is an essential component of physician's careers. For many years the Accreditation Council for Graduate Medical Education (ACGME) has required residency programs to promote scholarly activity to obtain and retain accreditation. Many programs interpret this to mean promoting research amongst their members. Encouraging students to publish during residency is believed to promote research throughout their careers, but little information has been collected and analyzed to verify this assumption. This study was undertaken to determine if publishing in peer reviewed journals during orthopedic residencies was an indicator of continued academic achievement post-graduation.

Methods:

We identified 201 orthopedic residency programs and randomly selected 50 credible programs to include. Of the 298 graduates, we recorded the number of peer-reviewed publications, H-index score, fellowship program and if the graduate is currently working in private practice or an academic setting.

Keywords: academia, publications, residents

More Alike Than Not: Higher Education and K-12

Cheryl Evans, University of Oklahoma, & Michaela Grandstaff

Abstract

This research is intended to expand on the limited study of leadership development across three areas of educational leaders: K-12, higher education professional, and higher education academic leaders. Background: Educational leaders from these three different groups are often viewed and treated separately, both in areas of research and practice. Methodology: A brief electronic survey was sent to more than 700 educational leaders. We will soon be sending a new electronic survey to current educational leaders from our peer universities and will also be doing a phone survey with those that wish to participate. Findings: There was noteworthy congruence in terms of the leadership theories utilized across the groupings, but differences in terms of where they received much of their professional education regarding leadership. However, with our new survey and with there being different people from different geographical regions in these positions we are interested to see if these results change and if they do how much they change. Future Research: This study raises questions regarding efficacy of professional development approaches, the value of leadership development, and the potential value of bringing together the three groups in professional development activities as a means of forging a more seamless system for students.

Reflective Quizzes and Personal Development

Kaylan Peterson

Abstract

The purpose of this research is to gain a better understanding of whether reflective writing exercises can generate a transformational shift of one's self-awareness, autonomy, and self-compassion. Several current research efforts in the Transformative Learning sphere indicate students lack sense of personal understanding, illustrating a need for classroom experiences to build into more than merely disseminating information about a subject (Christie et al., 2015). This project attempted to use reflective writing exercises to increase personal depth in the students, as well as increase course knowledge and engagement. This research is comprised of students on the first day of class being introduced to the study, consented, and then given Neff's Self-Compassion Scale, Emotional Self-Awareness Scale, Index of Autonomous Functioning, a demographic survey, and a five conditioned Q-sort of 18 adjectives which can be used to define aspects of personality. Though everyone in the classes completed the weekly assignments, only those who provided consent were included in the study. At the end of the course, the students completed the assessments again and analyses were ran on each. We expect to find such assignments will inspire reflective thinking about various topics involving perception of self.

Christie, M., Carey, M., Robertson, A., and Grainger, P. (2015). Putting transformative learning theory into practice. *Australian Journal of Adult Learning*. 55(1). 9-10.

A Statistical Analysis of a Child Abuse Prevention Education Program

Ryleigh Tucker & Tracy Morris

Abstract

In Oklahoma County, roughly one-third of girls and one-fifth of boys will be a victim of child abuse before they turn 18. Sadly, only one-tenth of these children will tell an adult about the abuse. The CARE Center is a child advocacy center in Oklahoma City that works to end child abuse. The CARE Center teaches children aged 4-8 how to ROAR, an acronym children can use to remind themselves about personal body safety, tell people about their abuse, and always have adults they can feel safe around. Children in classroom settings are asked a series of five questions before being taught the ROAR lesson. After the lesson, they are asked the same series of questions to determine what the children learned from the lesson. To date, the CARE Center has conducted this program in more than 150 classrooms across Oklahoma County. In each case, the numbers of children responding positively to the pre- and post-questions were recorded for each question, along with the total number of students, and their grade level. Additionally, demographic data concerning race, poverty, education level, parental support, etc. were collected from Oklahoma's Office of Educational Quality and Accountability. The focus of this project was to statistically analyze this data, to determine whether there are significant differences in the proportions of positive responses to the questions before and after the program. A variety of statistical methods was used including matched pairs analysis and regressio

Base Rate Data Primes Perceptions of Child Abduction

Taylor Pjesky & Robert Mather

Abstract

The media may provide misleading information to the public, often to increase viewers or readers. This often occurs in coverage of child abductions. In order to prevent children from becoming child abduction victims we must understand authentic threat probabilities and victimology. This study will aid in the correction of common misunderstandings, which can be used in prevention programs. One hundred and twenty-one participants were primed with facts and statistics from four different articles concerning characteristics of abducted children. Participants were randomly assigned to read base rate data from one of the four articles or not read an article. Participants then completed an online questionnaire about the probable characteristics of abducted children. It was hypothesized that the four primed experimental groups would show more accurate knowledge of characteristics of abducted children, whereas, the control group would show beliefs of common myths, and less accurate information. A MANOVA showed the results supported our hypothesis and indicated that the articles influenced the responses for thirteen of the thirty-three questions ($p < .05$). Article three influenced responses to all thirteen questions. The results show that information can influence perceptions of certain characteristics of abducted children. This study has implications for how media reporting may influence perceptions of child abductions which can be used to develop more robust prevention programs.

Gossiping and its influence on mood.

Madison Wheeler

Abstract

The purpose of this case study was to determine the influence of gossiping on mood. The participant attempted to reduce their amount of gossiping by implementing a reward system. The mood of the participant was studied before, during, and after the reward system began examined for fluctuations.

Reflective Quizzes and Personal Development

Anna Amorpour

Abstract

Several current research efforts in Transformative Learning sphere indicate that students lack a sense of personal understanding, indicating a need for classroom experiences to build into more than merely disseminating information about a subject or text; the budding view is to create a transformative atmosphere in the course (Christie, Carey, Robertson, and Grainger, 2015). Often being aware of a need doesn't equate to application or positive application of a principle. Additionally, an educator may assume that ze (the use of ze and zir is to embrace inclusion of LGBTQ+ gender neutral pronouns and avoid biases and are not typos) must completely reorganize zir classroom to attempt a transformative experience, which could seem too daunting. This project will attempt to use simpler, and less classroom intrusive, reflective writing exercises to increase personal depth and transformation in the student. Shapiro, Kasman and Shafer (2006) identified the usefulness of reflective writing for medical students as a practice to transform their depth of empathy for the none medical issues that their patients would be experiencing, which the researchers found to help practitioners gain mindfulness and presence of others.

Elementary Students' and Teachers' Perspectives on Teacher Caring

Jericho Hobson

Abstract

The purpose of this research is to explore and compare teachers' and students' perspectives of teacher caring and its meaning in the elementary classroom in the U.S. Midwest. The problem is that educators have a multitude of competing responsibilities in the classroom. Through a better understanding of how teachers enact care and how students receive care in the classroom, interactions and efforts could change to positively impact all classroom participants. This qualitative, Narrative Inquiry study utilized face-to-face interviews and artistic and writing prompt responses to reveal the ways that participants enact and receive caring in the elementary classroom.

The two teacher participants and the four student participants in this study shared their stories of teacher caring, defined as teacher's dedicated engagement with students personally and academically. Teachers demonstrate care for their students when they dedicate time to students to help them grow in the content areas studied in the classroom and when they assist students personally with their health or to ensure their safety. Lastly, teachers tell stories of caring for their students when they support students through difficult circumstances in life. As students encounter challenges in their school or personal life the teachers in this research support students and offer guidance, kind words, or kind actions as needed

Recreational Reading Reduces Rampant Restlessness: The Effect of Anxiety Among College Students

Mackenzie Blake

Abstract

Anxiety and depression are the top concerns among college students, affecting approximately 41.6% and 36.4% of students, respectively. College students have high stress levels due to academic pressure to succeed, environmental changes, financial problems, and an overuse of social media. College students spend an inordinate amount of time on technology and social media which tends to increase anxiety levels (Cheever, Rosen, Carrier, and Chavez, 2014) and may be correlated with a decrease in interest and in ability to read at the university level. The author noticed similar levels of frustration in her younger brother when he had to read for academic purposes, especially when distracted by technology. This frustration has caused him to replace reading with technology, the same pattern that has been observed in college students. This study will look at the effect recreational reading may have on anxiety and depression levels among college students, especially if accompanied by a reduction in the use of technology. As a future school psychologist, getting students to enjoy reading for pleasure, at a young age, may help mitigate levels of depression, anxiety, and feeling overwhelmed by course content at the college level. It is expected that there will be an indirect relationship between anxiety and time spent reading for pleasure.

Reduction of Social Media usage and its Influence on Hours Slept at Night.

Leslie Velazquez & Vickie Jean

Abstract

The purpose of this study was to determine if reducing social media usage at night would increase the hours slept at night. The participant attempted to reduce social media usage by setting a timer on a phone that would block all social media apps after a certain amount of time used. The amount of time slept at night was monitored before, during, and after social media limitations to see if it shifted.

Integrating Classroom Experiences Resulting in Transformational Learning

Alexandrea Erbyynn, Korie Hilliard, & Susan Mathew

Abstract

College students are intellectually challenged by their professors. Most professors coach students to integrate classroom content into their everyday life resulting in transformational learning which has been associated with increased classroom engagement and conceptual change (Merriam & Ntseane, 2008; Pugh, 2011; Vanderlinden, 2014). The purpose of the present study is to examine how students attending a Historically Black College or University (HBCU) integrate their classroom experiences resulting in transformational learning. More specifically, the study investigated the effect of HBCU students across levels of academic classification upon transformational learning. Data for the current study were obtained from surveys completed by HBCU students (N = 519) in Oklahoma which consisted of demographic questions and measures to assess Transformational Learning (Pugh, Linnenbrink-Garcia, Koskey, Steward, & Manzey, 2010). All assumptions underlying the use of the one-way statistical model were verified in this study. ANOVA results indicated statistically significant [$F(5,513) = 7.919$; $p = .000$] differences in transformational learning between the levels of academic classification. Calculation of omega square suggested that about 6% of the variability in transformational learning may be due to the levels of academic classification which according to Cohen (1988) is evidence of a moderate effect size of academic classification on transformational learning among HBCU students.

Self-Doubt to Self-Do: The Effects of Mindfulness Meditation on Self-Doubt Thinking

Vickie Jean & Alexis Cannon

Abstract

Self-doubt is defined as the lack of confidence one has in oneself or one's abilities. Mindfulness meditation, for this case study, is defined as the psychological process of being aware of an individuals' place in the present time and processing overwhelming stimuli in a productive manner. To decrease the frequency in which an individual engages in self-doubt thinking, this study introduces the daily practice of mindfulness meditation. This study uses a frequency table and line graph designed in SPSS (Statistical Package for Social Sciences) of baseline vs treatment frequency of self-doubt thoughts to analyze whether mindfulness meditation has a significant effect on self-doubt thinking.

The Effects of Starting an Online Business on Social Media Usage

Perianne Phillippe

Abstract

In a time of life where busyness and productivity are highly valued, college students still spend a copious amount of time on social media. Despite often working full-time jobs, taking on heavy course loads, and completing other tasks on their seemingly endless to-do list, they still find time to stay up-to-date on other people's highlight reels. Social media use further increases an already excessive amount of screen time and has been linked to numerous mental health issues. A possible reason for so much social media use within college students is a lack of efficient time management; that is, participating in activities that are productive, mentally stimulating, and rewarding. The researcher hypothesized that an individual who starts an online business will see a decrease in the amount of time they spend on social media. The subject-design is a case study that follows an individual over the course of 15 weeks. An AB design is used to measure the baseline of social media use before treatment (starting an online business) and after treatment. This research is still in progress so there are not yet results or conclusions to report.

Parents' Perspectives on Children's Play and Language Development?

Sara Moon-Seo

Abstract

This study explores how parents' perspectives on children's play are related to the vocabulary development of 8 typically developing children between 1 and 3 years. Each parent participated in a face-to-face and semi-structured interview and completed a child vocabulary checklist. Researchers interviewed each participant for 20-30 minutes using semi-structured and open-ended questions including definition of play, types of activities with children, and positive and negative consequences of play. Interviews were audio recorded and transcribed. Participants completed the MacArthur-Bates Communicative Development Inventories: Words and Sentences (CDI-WS) (Fenson, et al., 2007) to report their children's expressive vocabulary skills. Results reveal that parents describe the definition of play in three recurrent common themes. Children whose parents view play as a learning context produced more expressive vocabulary compared to children whose parents view play as having fun or social interactions. Although there were common characteristics of describing play, each parent has his/her own definition of play and play activities with their children addressing the benefits of play and the negative consequences of play. This study discusses how their common and unique perspectives are related to children's vocabulary development. The study also discusses possible clinical implications of play as a medium to support children's language learning.

Multi-Variant Analysis of College Students' Motivation

Daniel Morales

Abstract

In this study, students at the University of Central Oklahoma were asked to participate in a survey seeking to explore personality styles regarding one's academic motivation. A pilot study conducted with faculty supervision asked participants to complete three questionnaires, the BIS/BAS, (Carver, C.S., & White, T.L., 1994) the introversion scale, (Eysenck, H.J., 1970) and a revised form of the Hospital Anxiety and Depression Scale (HADS)(Zigmond & Snaith, 1983) as well as a demographic form that looked for variables such as academic classification, personality types, GPA, age health status, or if a student has had concussion in the past could influence motivation, etc. These factors were collected in an effort to test the hypothesis that factors such as introversion, anxiety and even academic classification affect motivation.

Understanding the College Completion Agenda on a Community College Campus: The Lived Experience of Faculty and Administrators

Carolyn Cox

Abstract

In an effort to support the nation's workforce and economy, community colleges have implemented degree completion strategies aimed at increasing the number of skilled and educated employees. This case study explored the lived experiences of administrators and faculty members while implementing degree completion initiatives on an urban community college campus. Multiple themes emerged from the data and revealed both the processes and possibilities for future reform initiatives and research. Study participants shared experiences in developing a data-driven picture of the institution and participating in course redesigns that transpired in programs where the greatest student attrition occurred, resulting in a "set curriculum" across all course sections. Participants revealed various perspectives in the role administrators played in the course redesigns and how they increased their dedication to increasing degrees through faculty professional development. Over time, more students began to complete their courses, and the institution experienced an increase in persistence and retention rates and college degrees. An open social system model was applied to the data in a post hoc fashion as a tool to examine first, the interaction between the environment and the institution and second, the interaction taking place internally between the multiple sub-systems of actors.

The Positives of Procrastination

Stephanie Widick

Abstract

According to Novotney (2010), 80% of college students procrastinate when it comes to coursework. Procrastination is often thought of as negative and self-destructive behavior. However, active procrastination is different from procrastination. Active procrastination deals with intentionally putting a task off, but allowing enough time to complete the task in a timely manner and achieve a satisfactory outcome. The purpose of this research is to provide new interpretations of procrastination and examine how it can be logical, beneficial, and emotionally based.

Neglect and Functional Fixedness

Jaely Wright

Abstract

Many things can contribute to an individual's level of functional fixedness. Functional fixedness can be similar to problem solving. Depending on the circumstance that one might be in, it might be required that we think creatively when trying to find a solution to a problem. Current research shows that trauma, abuse, neglect, socioeconomic status and mental illness can influence how low or high someone's functional fixedness is (Kasckow et al., 2012). People who have experienced abuse, emotional distress, and mental illness are prone to having lower problem-solving skills in comparison to someone who has not experienced a high level of trauma (Maurex et al., 2010). The purpose of this research project is to conduct an experimental study that examines the validity of the hypothesis that neglect influences one's level of functional fixedness. The research conducted in this study will contribute to the research on functional fixedness and will hopefully demonstrate that neglect does in fact have an effect on an individual's level of functional fixedness. It will also expand perspectives of cognitive and social psychology, perspectives of self and others. This study if conducted and published, could be used by the community to apply the findings to their own lives as well as potential implications for others such as an idea for psychological treatment.

Curriculum specialists in the conversation of change: A third space approach

Kimberly Church

Abstract

Schools today continue to look for new and innovative ways to meet the demands of an increasingly complex educational landscape. Many schools employ site-based curriculum specialists (e.g. literacy coaches, instructional coaches, resource specialists) as a means to improve student learning outcomes by improving aspects of curriculum and instruction. However, this work often fails to produce quantifiable results district leaders or stakeholders expect. To better understand how these specialists might play a more purposeful role in the school's change efforts, this qualitative narrative inquiry explored how six site-based curriculum specialists negotiated competing forces within their school to initiate and sustain change efforts. Participants were purposefully sampled based on job title and responses on an initial survey about their work. Using third space theory as a guiding framework, the author sought to understand how the specialists' roles and identities influenced the work they did in supporting both principals and teachers in their work in the school. The study found that while there were pockets of success among the specialists in the study, they struggled overall to find the space needed to engage with members of the school staff in ways that lead to substantive change. Through an analysis of key tenants of third space theory, the author purposes alternate ways of involving site-based curriculum specialists in the school's curriculum conversation of

How Does Foster Parenting Impact the Marital Relationship?

Hailey McClain

Abstract

Research has deemed the incorporation of a child into a family as a crisis because of loss of sleep, lower sexual responsiveness, economic pressures, increased chores, and stress (Anderson, Russell, & Schumm, 1983; LeMasters, 1959; Leavitt, McDaniel, Maas, & Feinberg, 2017). In addition to the universal responsibilities of caring for a child, foster parenting involves working with birth families, arranging resources for foster children, forming a secure parent-child relationship, helping children adjust, maintaining records on the child, and working with foster agencies (Rhodes, Orme, & McSurdy, 2003). Being aware of the marital affects couples may experience while fostering, in addition to many other obstacles foster parents face, can help service providers ensure the well-being of foster parents and ultimately the children in their care.

With ecology theory as a lens, this study investigated the relationship between the perceived marital satisfaction of foster parents and the stresses of fostering as well as how foster parents perceive fostering to have impacted their marital relationship. It was hypothesized that fostering would have a negative impact on perceived marital satisfaction and foster parents would perceive their experience fostering to have negatively impacted their marital relationship.

Emotional Labor and the Work of the Funeral Director: A Qualitative Study of the Management of Feelings among Recent Licensed Funeral Directors.

Cami Cho & Gary Steward

Abstract

Funeral directors are integral to the death care industry, assisting families in the unpleasant and often taboo phenomena of death. They are expected to display appropriate emotions for paying customers. Hochschild's (1983) seminal work on emotional labor sparked a cascade of research. Most research investigated service occupations, in which individuals exchanged compliance with organizational emotional expectations for compensation. This qualitative study builds on previous research to investigate the dynamics of emotional labor among funeral directors.

Developing a grounded theory of family process and well-being in "boomerang families"

Shaun Calix

Abstract

Boomerang families are families in which adult children have returned to live in their parents' residence after having lived independently for a significant period of time (Mitchell, 1998). The research literature on boomerang families mostly has focused on the reasons adult children move back home, and the impacts of having boomerang children on parental well-being. Although some research indicates that "boomerang children" are associated with poor parental well-being (Davis et al., 2018; Wister et al., 1997), other research indicates that parental well-being depends on the reason for the adult child's return to the home (Mitchell, 1998; Mitchell and Gee, 1996).

The purpose of the current study is to construct a grounded theory of family processes and well-being in boomerang families. Grounded theory methods (Corbin & Strauss, 2008) will be used to conduct this research.

Participants are recruited from a community in the Southern Great Plains. Participants are interviewed using semi-structured interviews. Two interviews already have been conducted, and the preliminary data indicates that parents and adult children experience infrequent negotiations regarding chores, and parents generally try not to interfere in their children's private lives. Both participants who have been interviewed thus far reported feeling satisfied with their current living arrangements, and experiencing high well-being, though one would like to move into his own residence

Honey, Do You Love Me When I Play Games?

The Effects of Online Games on Offline Couple's Relationships

Thy Nguyen

Abstract

Online games have become one of the phenomena to the young generations. Previous research discussed the negative effects of online gaming. However, whether online games can improve or deteriorate the couple's relationship remains a question. We obtained 60 participants who completed a list of 140 questions about their experience as couples who play online games together. We wanted to examine whether couples preferred playing online games with their partners and whether they have issues with their gaming hours, which may affect the quality of their offline romantic relationships. We also wanted to see whether online games can promote healthy relationships for partners who have avoidance and anxiety issues. We hypothesized that partners with high avoidance and anxiety levels may spend more time on online games, which may result in lower satisfaction in their relationships. Although we did not find a significant difference in the gaming hours and the satisfaction of the couple relationships, more than half of the couples did not have problems with their partners' playing online games as long as they receive love, care, and support from each other. This may help with their intimacy and conflict resolution, which may increase the quality of their romantic relationships. The study can contribute to family and couple therapy in clinical practice. The couples may understand how to enjoy playing online games together while maintaining their healthy offline relationships.

An Analysis of Publication Trends and Its Relationship with Academic Success Among Dermatology Residents and Fellows

David Wenger

Abstract

Our results demonstrate that graduates of dermatology residency and fellowship programs are actively involved in research opportunities throughout their medical training. Even though most dermatology graduates have had successful research outcomes, less than one-half pursued academic medicine. We emphasize the importance of active involvement in research during one's medical training in order to teach training physicians how to accurately interpret and apply research outcomes to better patient care.

Publication Trends in Family Medicine Graduates: A Cross-Sectional Review

Vanessa Lin

Abstract

Purpose: The ACGME emphasizes the importance of research throughout residency as it establishes the basis of evidence based medicine. As future physicians practicing evidence based medicine, it is crucial that physicians in training are able to both interpret and produce quality research. Currently, the long-term impact of active research participation is unknown in this population. In this study, we aim to (1) explore research activity as measured by peer-reviewed publications among family medicine residency graduates and (2) determine if an association exists between publication rates before, during, or after family medicine residency. **Methods:** We utilized a cross-sectional study design analyzing research output by family medicine residency graduates in relation to future publications and academic involvement from a random sample of 50 family medicine programs. Data were extracted for each graduate and analyzed using STATA 15.1 and Microsoft Excel. The public protocol can be found here: <https://osf.io/pwa6d/>. **Results:** We identified 654 residency programs of which we randomly sampled 50. Among the 50 programs, 8 were included, totaling 101 graduates from family medicine residencies for analysis. Of the 101 analyzed residents, 76 (75.2%) produced zero publications. Of the analyzed residents, 30 (29.7%) pursued a fellowship, with most in sports medicine (5/101 [5.0%]). The mean number of publications for all analyzed residents was 0.8, with most publishing after completion of

Publication Trends Among Anesthesiology Graduates and Its Relationship with Future Academic Success

Sydney Ferrell, Matt Vassar, & Micah Kee

Abstract

Research during medical training is widely considered to be an integral component of residency and fellowship match success, with many residency programs encouraging residents to engage in scholastic activities, such as serving as authors on peer-reviewed publications. However, the degree to which these scholarly practices continue beyond residency is unknown. Here, we report an investigation of publication trends among graduates of anesthesiology residency programs as part of a larger initiative to examine publication trends and academic achievement across medical specialties.

A Cross-sectional Analysis of Psychiatry Residency Graduate Peer-reviewed Publication Trends

Jace Schell & Jourdan Waddell

Abstract

Scholarly activity through research is widely considered to be an integral component of medical training, and residency or fellowship match success. However, the rate of these scholarly practices in psychiatry residency graduates is relatively unknown. Here, we aim to (1) describe factors associated with scholarly research activities, as measured by peer-reviewed publications, among psychiatry residency graduates, and (2) determine if an association exists between publication rates before, during, or after psychiatry residency. We employed a cross-sectional study design analyzing research output by psychiatry residency graduates in relation to future publications and academic accomplishments from a random sample of 50 psychiatry residency rosters. Data were extracted for each graduate and analyzed using STATA 15.1 and Microsoft Excel. We identified 249 residency programs of which we randomly sampled 50. Among the 50 programs, 7 were included, totaling 122 graduates from psychiatry residencies to be analyzed. Of the 122 graduated residents, 57% (69) produced no publications. Of the graduates who pursued a fellowship, 25.4% (31/67) entered into Child & Adolescent Psychiatry. Of the 53 published graduates, most of their publications were received before residency, making up 68 of the 183 publications (37.2%). Compared to before residency, the total number of publications during residency training.

Juror Note-taking: How Jurors Affect Each Others' Memories

Caitlin Pratt

Abstract

This study will see how the opinions of a juror who takes notes during a trial influences the opinions of other jurors. The non-note-taking juror may rely on the memory of the note-taking juror. If that is the case, could this juror's memories actually be altered? Research suggests that being exposed to misinformation after an event can alter a person's memory of that event, especially if it comes from a "reliable" source, and some research specific to jury-settings does suggest that jurors may be influenced by opinions of other jurors who have taken notes. Further research is needed to investigate whether a juror's actual memory of the testimony is influenced, or just their judgement of the verdict. In this study, participants will watch a video of a witness testifying at a mock trial. They will be tested on their memories of the trial and then sent to "deliberate." A confederate will have notes with inaccurate details about the testimony. Participants will be tested again on their memories to see if the participant incorporates the other juror's inaccurate details. It is hypothesized that participants' verdicts will be changed by the opinion expressed by the note-taking confederate, and that participants' memories of the trial's details will be changed.

A Cross-Sectional Review of Publication Trends among OBGYN Graduates

Alyssa Lindsey

Abstract

Purpose: Research and other scholastic activities are essential components of medical training and may be predictive of success with matching into residency. Despite this importance, little is known about the scholastic involvement of obstetrics and gynecology residency graduates. In this cross-sectional analysis, we will (1) explore the relationship of publications of OBGYN residency graduates and (2) publication rates before, during, and after residency.

Methods: We assessed research output by OBGYN residency graduates and its relationship to future publications and academic involvement from a random sample of 50 OBGYN residency rosters. Data were extracted for each graduate and analyzed using STATA 15.1 and Microsoft Excel. A protocol is publicly available here: <https://osf.io/pwa6d/>.

Results: We identified 281 residency programs of which we randomly sampled 50. Among the 50 programs, 15 were included, totaling 303 OBGYN graduates available for analysis. Of the 303 graduates, 111 produced zero publications, and 137 produced 1-5 publications. 79 graduates pursued a fellowship. Academia was pursued by 46/303 of graduates. The average number of publications per resident was 2.9, with most occurring after residency.

Conclusion: Graduates of OBGYN residency programs are publishing most research after residency, and the least amount during residency training. This suggests that there may be an opportunity for residents to increase their scholastic activity while in training.

A systematic review and meta-analysis of frequency of acute kidney injury following intravenous contrast administration

Trevor Bickford & Matt Vassar

Abstract

Purpose: To update a meta-analysis of controlled studies examining the incidence of acute kidney injury (AKI) after exposure to intravenous contrast media compared to AKI after imaging without contrast. The original study was published in 2013 and is the basis for multiple guidelines. The original study called for additional trials using a control group. This study attempts to collate the studies conducted on this issue to strengthen the evidence base behind related clinical recommendations. **Methods:** EMBASE, Scopus, and Medline were searched using the same search criteria as the 2013 meta-analysis with the time period of interest changed from before 2011 to 2011 to present. Abstract and full text screening followed the same criteria as the original meta-analysis. The same data points as the previous meta-analysis were recorded. Data from the previous meta-analysis was combined with our data, and all data were analyzed. Relative risk was calculated for incidence of AKI in both groups. **Results:** Of 8,358 studies identified, 34 met inclusion criteria representing 30,053,234 patients. The risk of AKI in the contrast group (RR=0.9806; 95% confidence interval [CI]:0.97, 0.99; p=0.0000000016) was similar to the non-contrast group. **Conclusion:** The meta-analysis from 2013 stated there was no difference in incidence of AKI between contrast exposure groups and control groups. Our data support this finding. Guidelines should be updated to reflect current research.

Gender Gap in Surgery

Shelby Rauh

Abstract

Objective: To determine if the creation of integrated surgical programs has increased the recruitment of women into surgical residencies.

Summary Background Data: Historically, there have been disproportionately lower numbers of women entering surgical residency programs compared to the percentage of women physicians. Per the ACGME, in 2017, women comprised 45.8% of all residents in training but just 29.9% of surgical residents. We sought to determine if certain factors, specifically integrated surgical programs, have made an impact on the number of women in surgical specialties.

Methods: Data regarding surgical residents and physicians was extracted from the Accreditation Council of Graduate Medical Education (ACGME) Data Resource Books and ACGME Association of American Medical Colleges (AAMC) Physician Specialty Data Reports from 2007-2018.

Results: Overall, integrated surgical programs consistently report increased percentages of women compared to non-integrated surgical programs.

Conclusions: The creation of integrated surgical programs has increased and will likely continue to increase the proportion of women in surgical residencies.

The potential effects of financial conflicts of interest of speakers at the Pulmonary/Allergy Drug Advisory Committee meetings.

Matt Vassar & Trevor Bickford

Abstract

Purpose: The Pulmonary-Allergy Drugs Advisory Committee (PADAC) evaluates the safety and efficacy of new drugs used in the treatment of pulmonary, allergic, and immunologic diseases. Previous studies have shown that positive recommendations from advisory committees are associated with drug approval by the FDA. We investigated the relationship between FCOI among public speakers at these meetings and PADAC voting patterns. **Methods:** We included the testimonies of all public speakers at the PADAC meetings using transcripts available on the FDA website. Speaker's overall statement about the drug - negative, positive or neutral - served as the dependent variable. Independent variables included if the speaker was taking the drug in question, if the speaker had the disorder treated by the drug, and if the speaker disclosed a FCOI. **Results:** We extracted data from 128 speakers; 38% (49/128) disclosed a FCOI. Speakers who disclosed a FCOI were significantly more likely to give a positive testimony (OR = 5.13, 95% CI = 1.83- 14.37, $P < 0.001$). Speakers who had the relevant disorder were also significantly more likely to provide positive testimony (OR=5.49, 95% CI = 1.84 - 14.37, $P < .01$). **Conclusion:** Our results suggest that public speakers who have FCOI are more likely to recommend drugs for approval. These findings combined with others show a consistent effect. Changes to the current guidance on FDA FCOI disclosure are needed, and the future role of public speake

Is Coca-Cola Bad?

Stephanie Curtis

Abstract

Coca-Cola is a very popular soft drink in our society. The ingredients include caffeine and sugar mixed with Phosphoric acid which create an addictive flavor. However, many people are not aware of the negative effects the drink has for people. This research explores harmful effects Coca-Cola can have on people's health. This research has found that the studies have shown that those negative effects can include, causing addiction among children, causing low bone density in women, causing accidental injury in adolescents while drinking, and leading to obesity.

Scholarly Research Productivity Among Otolaryngology Residency Graduates and Its Relationship to Future Academic Achievement

Matt Vassar, Adam Corcoran, & Matthew Ferrell

Abstract

Background: Our goal is to determine if an association exists between publication rates before, during, or after otolaryngology residency training and whether publication efforts may predict future academic achievement. **Methods:** In this cross-sectional analysis, we selected a random sample of 50 otolaryngology residency programs listed on Doximity. We assembled a list of graduating residents from 2013, 2014, and 2015. Using SCOPUS, PubMed, and Google Scholar, a list of publications for each graduate was compiled and data were extracted in an independent, double-blinded fashion by two investigators. **Results:** Before residency, graduates published a mean of 1.3 (SD=2.7) articles. During residency, graduates published a mean of 3.5 (SD=4.5) articles. After residency, graduates published a mean of 5.4 (SD= 9.6) articles. Residents who pursued a fellowship had more publications ($t_{205}=-5.3$, $p < .001$) and more first author publications ($t_{205}=-4.8$, $p < .001$) than residents who did not pursue fellowship training. Graduates who chose a career in academic medicine had a higher number of mean total publications ($t_{205}=-7.2$, $p < .001$) and first author publications ($t_{205}=-7.0$, $p < .001$) than those in private practice. **Conclusion:** Research productivity significantly correlated with future fellowship training, the pursuit of an academic career, and overall h-index. Our results indicate that promoting physician involvement in research may correlate to future academic success.

Pugs: The Terrible Truth

Hadley Krewall

Abstract

For centuries, pugs have been bred for their large eyes and squished in face, also known as "brachycephalic (squashed nose/flat-faced)," unknowingly creating man-made health complications that now affect their day-to-day life. The Kennel Club states that "50% of pugs have significant breathing problems and only 7% to 15% of pugs breathe like a normal dog." In her poster presentation, Hadley Krewall hopes to share her interesting research findings on the serious health issues that pugs face, and the ways to stop the breed from continuing to reproduce. The presenter also hopes to address what the Kennel Club and even the vets can do to help or speak up, and why it is imperative to consider the breed shift to extinction.

Functional Effects of Soy-Raffinose on the Quality parameters of Yogurt

Sanjeewa Gamagedara, Kanika Bhargava, & Roshaniben Chaudhari

Abstract

Yogurt is widely known for its nutraceutical properties. Beans are a healthy and easily affordable food containing good amount of raffinose that has been proven to possess prebiotic properties. Raffinose Family Oligosaccharides (RFOs) is the most commonly found sugar belonging to this group and is mostly contained in pulses. However, studies on yogurt and bean-raffinose are limited. The goal of this research was to isolate and characterize raffinose oligosaccharide from soybeans and demonstrate practical utility of raffinose oligosaccharide by studying its effect on the quality of yogurt. The fortified yogurts were studied for changes in physiochemical (pH, titrable acidity, color, syneresis, viscosity, water activity, total soluble solids, water holding capacity), fermentation, antioxidant, texture profile and microbiological properties. These changes were compared with the properties of 1% (w/v) Inulin fortified yogurt and plain yogurt as the control. Results demonstrated that RFOs enhanced the growth and viability of probiotics present in yogurt. The observed results clearly suggest that raffinose oligosaccharide enhances the overall quality of yogurt, thereby offering a probiotic yogurt with prebiotics, which can also be called a synbiotic yogurt.

Waste in The World's Oceans.

Ryan Dudley

Abstract

According to a study in January 2019, the impact of ocean pollution is degrading the health of our oceans and the marine life at an alarming rate. In his poster presentation, Ryan Dudley will talk about the rising issue of pollutants and waste that harm our oceans. In an attempt to raise his audience members' awareness, Ryan will share his research findings on what really harms our waters, and what we can do before it is too late.

Ebbeling Submaximal Predicted VO₂max compared to Fitmate Submaximal Measured VO₂ Assessment.

Randa Hollandsworth & Victoria Claflin

Abstract

The purpose of this study was to compare the results of the predicted Ebbeling Submaximal V_{O2} and measured Bruce Protocol Submaximal V_{O2} in college students (n=22). It is our hypothesis that the Ebbeling Submaximal Test overestimates V_{O2} compared to the measured Bruce Protocol submaximal V_{O2} assessment. Subjects performed an Ebbeling Submaximal Treadmill Test to establish a predicted VO₂max, after a minimum of 24 hours rest a submaximal assessment of oxygen uptake was measured using indirect calorimetry while completing the Bruce Protocol. Results were then recorded and analyzed using IBM SPSS Statistics (version 26), a Pearson Correlation coefficient and Paired t-test were used to analyze the relationship between the two measures. There was a strong positive correlation between the Ebbeling predicted and measured values ($r = 0.571$, $p \text{ value} = <0.005$). However, the paired t-tests revealed a significant difference ($t = 10.981$, $p = 0.000$) between the Ebbeling predicted ($53.64 \pm 7.03 \text{ mL.kg}^{-1}.\text{min}^{-1}$) and measured values ($38.09 \pm 7.30 \text{ mL.kg}^{-1}.\text{min}^{-1}$). This confirms our hypothesis that the Ebbeling Submaximal Treadmill Test overestimates V_{O2} values and therefore cardiorespiratory fitness in our population.

Publication Trends Among General Surgery Residents, Fellows, and Graduates and Its Relationship to Future Academic Achievement

Audrey Wise & Matt Vassar

Abstract

Medical research is considered a core component of the Accreditation Council for Graduate Medical Education (ACGME) residency programs. Our study aims to determine associated factors that influence publication rates before, during, and after general surgery residency.

Our cross-sectional study included a random sample of 50 general surgery residency programs. Using each program's online website, publicly available records were obtained for residents that graduated in 2013-2015. Previous publication information, h-index, medical degree, and fellowship pursued were obtained for each graduate by searching Scopus and PubMed. Microsoft Excel functions were used to calculate descriptive statistics and 95% confidence intervals.

Of the 30 included programs, 68 residents were analyzed for sample characteristics and publication rates. Among the 68 graduated residents, the majority, 31 (45.6%) had between 1-5 publications. Of the 68 residents, most pursued a fellowship in Minimally Invasive Surgery (14/68; 20.6%). Most research outcomes reported were during residency with a total of 150 (of 321; 46.7%) publications. Of the 321 total publications recorded, the lowest reported median was before residency.

Given that research remains a core part of ACGME general surgery residency programs, it is important for residents to continue progressing their scientific knowledge through continued research. In conclusion, publication rates remain the highest during residency.

Publication Trends Among Emergency Medicine Residents, Fellows, and Graduates and Its Relationship to Future Academic Achievement

Arjun Reddy, Shelby Rauh, Haley Riley, & Matt Vassar

Abstract

Purpose: Scholastic activity through research involvement is a fundamental aspect of a physician's training, and may have a significant influence on residency and fellowship match success. Despite this fact, little is known regarding the pursuit of academia and/or fellowships in emergency medicine (EM) graduates. In this review, we will describe the factors involved in academic research including peer-reviewed publications among emergency medicine residency graduates and determine if a relationship exists between publication rates before, during, and after EM residency.

Methods: Using a cross-sectional study design, we analyzed the research output of EM graduates and its relationship to future academic involvement from a random sample of 50 EM programs' graduates. Data were extracted for each graduate and analyzed using STATA 15.1 and Microsoft Excel. A public protocol is available here: <https://osf.io/pwa6d/>.

Results: Of the 154 analyzed graduates, 97 (63.0%) were male, 91 (59.1%) were osteopathic graduates, and 91 (59.1%) had zero publications. Additionally, we found that 26/154 (16.9%) pursued academia and 16/164 (10.4%) pursued a fellowship, with 4/16 (25%) in medical toxicology and 4/16 (25%) in emergency medical services. The mean number of publications for each graduate was 0.87.

Conclusion: While a majority of EM graduate's publications were post-residency, many publications occurred during residency, with the lowest number of publications occurring.

Changing the Behavior of Negative Self Talk

Isabella Vander Putten

Abstract

The objective of this research is to determine if reinforcing conscious positive self-talk will reduce unconscious negative self-talk. My hypothesis is that the participant saying five positive things about the participants' self every morning and every night will decrease the participants' negative self-talk. A baseline of the behavior, days that the participant had a presence of negative self-talk, was recorded before the attempt to change the behavior began. Every morning and every night the participant would say 5 positive things about themselves from a list previously made. The behavior, the presence of negative self-talk, is recorded throughout. It is predicted that the behavior of unconscious negative self-talk will significantly decrease in response from the conscious positive self-talk.

The Effects of Hugh Jackman's Basal Cell Carcinoma Disclosure and Public Interest in Sunscreen

Matthew Ferrell & Matt Vassar

Abstract

Background: Public awareness for basal cell carcinoma (BCC) is particularly important, as its major risk factors - increased sun exposure and number of sunburns - are largely preventable.

Objective: Determine whether social media posts from celebrities has an affect on public awareness and preventative interest for basal cell carcinoma.

Methods and Materials: We used Google Trends to investigate whether public interest in sunscreen increased following social media posts from Hugh Jackman about BCC. To forecast the expected search interest for BCC, melanoma and sunscreen in the event that each celebrity had not posted on social media, we used the autoregressive integrated moving average (ARIMA) algorithm.

Results: We found that social media posts from Hugh Jackman, a well-known actor, was associated with an increase in searches for "sunscreen" three of the four times there was an increase in BCC interest.

Conclusion: Our data found an that there was an increase in sunscreen searches after disclosure from the popular celebrity Hugh Jackman. This suggests that celebrities could influence preventative measures of the public. Further research should be done to analyze the full impact of preventative measure taken by the public because of celebrities' personal disclosures of health issues.

Publication Trends of Urology Medical Students, Residents, and Beyond

Matthew Bruns, William Nowlin, Bradley Johnson, Austin Johnson, & Matt Vassar

Abstract

In urology, research is critical to the advancement of patient care. Thus, a need exists to develop urologists who are competent to perform research. The ACGME requires scholarly activity for both residents. Little, however, is known about the extent of urology residents to participate in research. Our study addresses this. We used Doximity to derive a list of all urology residency programs in which we obtained a random sample of 50 programs. We first searched each program's websites to determine whether residents were listed, and if so, we extracted this information for all residents for the years 2013, 2014, and 2015. If such information was not available, we requested this information from program directors by email. We then used SCOPUS, PubMed, and Google Scholar to gather the publications from each resident, which was done by two authors in a duplicate blinded fashion. Here, we present an interim analysis while we continue with data collection. Of the 50 programs, 23 are included in our final sample, totalling 156 residents. Collectively, residents produced 1888 publications. The mean number of publications for residents, stratified by stage of training, are as follows: 1.1 (SD =2.3) before residency, 4.5 (SD=4.5) during residency, and 6.6 (SD=9.2) after residency. Since urology research training and participation during residency may be critical to the field, efforts are needed to encourage residents to continue research engagement.

Guilty Until Proven Innocent: Jurors' Perceptions of Culpability When Legalized Marijuana is Used

Ebony Harrington

Abstract

The usage of marijuana has been a highly debated subject for a long time. Many believe it is a harsh, gateway drug while others feel that the use of this natural substance can positively affect, not only an individual's mind, but heal the body as well. In this study I will be looking at how a juror's biases towards the usage of marijuana being involved in court cases may affect their perception of the individual on trial and the overall decision on a verdict. The study will ultimately include a heavy review of literature surrounding such topics as marijuana usage in society, juror bias in court, and the causes and effects of such biases in court, followed by an experiment examining these effects. This will be done using an anonymous survey that participants will fill out which will include demographic questions, a fictional case example, questions about the usage of marijuana, and multiple scales such as the Juror Bias Scale (JBS) and the Attitudes to Punishment Scale (APS). The answers from this survey will then be analyzed using the Statistical Package for the Social Sciences (SPSS) and the results will be further studied. Individuals with a prior negative bias towards the usage of marijuana are expected to show an increase in the guilt attribution while participants who either hold a positive bias or possess neutral feelings towards marijuana usage would report more leniency.

Object Recognition Software vs. the Human Visual System: Assessing Accuracy and Speed

Kelly Rogers

Abstract

Over 1,000 fatalities occurred amongst civilian and police officer interactions during the year of 2017 (“Mapping Police Violence”, 2017). Over 50% of these fatalities happen due to the Mistake of Fact Phenomena (Stover et al, 2009). In short, this is a misperception of events/people by law enforcement due to erroneous categorization processes. Social categorization is a strictly human error, and this study sets out to rectify this issue by proposing the use of a cheap, user-friendly, and wearable object recognition software in law enforcement. Since no prior studies have compared the efficiency of object recognition software at accurately detecting objects to human accuracy, this study will compare the human naked eye to the use of the software. Since there is no room for human error, it is hypothesized the object recognition software will be more accurate and as fast as the human visual system.

UCO Psychology Majors' Awareness of the Psychological Implications of Disfluent Speech Disorder

Linda Sealey & Karissa Marion

Abstract

Karissa Marion and Dr. Linda Sealey-Holtz, Department of Speech-Language Pathology, University of Central Oklahoma, 100 N University Dr, Edmond, OK 73034

The purpose of this study is to assess the knowledge and understanding of fluency disorders and the psychological effects on people who stutter among undergraduate psychology students at the University of Central Oklahoma (UCO). The participants in this study are students who are enrolled in a psychology course at UCO and are pursuing a Bachelor of Arts in psychology. Each participant in the survey will be assessed by a 20-question survey with both multiple choice and knowledge rating scale questions related to fluency disorders and their potential secondary effects. It is estimated there will be 100 participants in the survey. Data analysis will include comparison of composite scores by group factor for academic level, freshman, sophomore, junior, and senior. It is expected that upperclassmen will have higher scores, if they have more knowledge in this area secondary to training and coursework in the major. Conversely, it is hypothesized that scores will be low at earlier academic levels if there is little to no training in the earlier academic work. Results will be presented in descriptive analysis and graph illustration of participants scores in total and across academic level.

Little to no research was found to ha

"What is the Relationship between Task Context and Recall Accuracy?"

Hannah Whitten

Abstract

The context of task complexity is something that is manipulated in the field of education regularly- the test your professor gave you might have easier questions at the beginning of the test and progressively become more complex. Does this direction of complexity effect how we do on tests? The current study seeks to identify if ascending task complexity is perceived as easier or more difficult than descending task complexity. Accuracy is measured to account for retention and pupil dilation and fixation will is used to measure stress. Students who are required to complete more complex tasks first, are predicted to do worse overall than those who are given easier tasks first.

A Novel Introduction to Interprofessional Education and Practice: Grand Rounds

Katarina Boyles

Abstract

Interprofessional education is defined by the World Health Organization as an experience that “occurs when students from two or more professions learn about, from, and with each other (WHO, 2010). Studies have shown that a Grand Rounds-style concept is effective for education in the allied health settings. Would a novel Grand Rounds-style event introducing IPE affect a change in the participant’s self-evaluation of their knowledge and skills relating to IPE and interprofessional practice (IPP)? A cross-sectional study will be conducted utilizing pre-event and post-event surveys created and conducted using qualtrics. The Interprofessional Attitudes Scale (IPAS), which includes 27 items which are rated on a 5-point Likert scale (Norris et al., 2015) will be used to measure the interprofessional attitudes of the participants.

Transformative Learning Communities

Mary Springfield

Abstract

Traditionally, professional development (PD) involves discussions, observational analyses, and learning through new approaches and experiences as faculty members in the K-12 education system (Engin & Atkinson, 2015). However, there is a new perspective on professional development in higher education that involves new practices, technology, and collaborative efforts within a learning community. A professional learning community (PLC) is comprised of committed, life-long learners that hold a common theme or goal to better students' learning, education, and experiences in academics (Engin & Atkinson, 2015). Professional learning communities are also known as faculty learning communities (FLC). Our Embodied brain learning community started as a book club that aimed to bring new ideas to the faculty members about creative ways to expand knowledge about mind, brain, and education. As a graduate research assistant, I have contributed thoughts about student involvement and impacts of the organization on the future of higher education. There were many successful outcomes that arose during the first steps, during the integration phases, as well as post-research during data collection. There was positive feedback, from not only the students, but from the faculty learning community as well.

Visitation Restrictions in the Adult ICU

Tiana Young-Mauchly, Carlie Edstrom, & Julia Buckingham

Abstract

The importance of providing a holistic and autonomous approach to patients directly relates to improved satisfaction. The purpose of this evidence-based project was to determine how unrestricted ICU units compare to restricted units. The intensive care unit is a specialty area in the hospital for critically ill patients who are either stable or unstable that require intensive care, monitoring, treatment, and possible emergency interventions. Many of these patients are intubated and unable to speak for themselves. Unrestricted visitation in the adult Intensive Care Unit eliminates definite guidelines on who can and cannot visit patients in the ICU. Unrestricted guidelines will also allow visitors during all hours of the day. Unrestrictive guidelines have shown to benefit the patient, family, and staff psychologically and physiologically. On the contrary, restricted visitation in the adult intensive care unit puts regulations on who can visit patients in the ICU. Restrictions include age of visitors, time of day of visits, relation to the patient, and personal protective equipment worn. Research suggests that unrestricted ICU visitation policies promote an overall favorable experience for patients, family and staff. Therefore it is of upmost importance to make the change and open the doors of Adult Intensive Care Units.

Digital Oral Thermometer and Temporal Artery Thermometer: An Accuracy Comparison

Lizette White, Taryn Gavitt, & Taylor Hole

Abstract

The purpose of this study is to prove the increased accuracy of the digital oral artery thermometer when compared to the standard use of the temporal artery thermometer. The population included in this study covers patients across the lifespan, ranging from pediatrics to adults. The most common practice for temperature measurement in patients in the health care setting is the temporal artery thermometer. This evidenced-based practice project compares the accuracy of digital oral artery thermometers against the temporal artery thermometer. The desired outcome is that this comparison of accuracy would change the standard intervention in measuring patient temperatures to the digital oral artery thermometer. The time frame of interest applies to patients during their time in a health care setting. Non-invasive thermometer methods is the most common practice in the health care setting to measure patient temperatures. Although temporal artery thermometers are the most commonly used method, studies of its accuracy are minimal. Through the research used for this evidence-based project, digital oral artery thermometers have been shown to be more accurate and consistent. The desired impact to health care settings would be a shift from the use of temporal artery thermometers to the use of digital oral artery thermometers. This could contribute to the decreased length of hospital stays, the earliest detection of temperature rise in infection, and aid in accurate diagnosis and treatment.

Spirituality In End-Of-Life Care

Briana French, Kaitlin Jones, & Jessellen Frantz

Abstract

The purpose of this evidence-based project was to determine if death anxiety could be reduced by spirituality in palliative care patients. All human beings experience death whether it be someone they know or inevitably their own mortality. Death is perceived differently by all patients and can bring about anxiety during end-of-life care. Completing a spiritual assessment on all patients, as well as other interventions such as praying, singing, meditation, etc. can aid in spiritual support across all medical specialties. Death affects every human, therefore this project has the potential to touch many lives. In various studies, different scales were used to assess patients' spiritual needs and death anxiety during their end-of-life care. The results concluded that spirituality is not always a routine assessment in many health care settings and that patients feel as if medical personal are not properly trained in this area. Spirituality has been found to improve patients' physical and emotional response to death and reduce death anxiety altogether.

Art Therapy in Oncology Patients

Krystyn Hawkes, Clarissa Coble, & Anabel Segovia

Abstract

According to the National Cancer Institute, in 2018, there were over 1,700,000 new diagnoses of cancer in the United States. Of these, over 600,000 will die from this disease. Understandably, a diagnosis of cancer, as well as the treatments that accompany the diagnosis, can cause extreme distress to a patient. This distress can include stress, anxiety and depression. These psychological factors can also influence physical functions such as sleep, appetite and the immune response.

There are multiple therapies available to treat the distress that accompanies the diagnosis and treatment of cancer. Typically, treatments for cancer associated distress include pharmacologic treatments as well as complementary treatments such as support groups and counseling. The use of art therapy as an additional complimentary therapy has been shown to decrease the distress that is associated with cancer diagnosis and treatment. Art therapy has been used for decades as a complementary therapy for psychological disorders but has just recently begun to be used in other disciplines such as oncology.

Studies have shown the use of art therapy in oncology patients can decrease stress, anxiety and symptoms of depression. It has also been shown that art therapy increases feelings of well-being and overall quality of life.

Effect of Baccalaureate Degree Nurses vs. Associate Degree Nurses on Patient Outcomes

Brooke Handke, Amy Kleinvachter, Tasha Swallow, & Joni Welch

Abstract

Healthcare continues to face enormous challenges, including a growing, aging population and with that, a more complex presentation of illnesses. These issues lead to poorer health outcomes. As these challenges arise, it is increasingly important for the nurse workforce to remain highly educated and competent to care for their aging, ill patients. This leads to the discussion of the importance of educating nurses at higher levels, such as the baccalaureate level. The baccalaureate prepared nurse is able to improve the quality of care and patient outcomes. The Institute of Medicine outlined specific goals to enable nurses to optimally meet the growing demands of healthcare in the United States. A key recommendation was to increase the number of baccalaureate prepared nurses from 50 percent in 2010 to 80 percent by 2020. This recommendation was strongly supported by evidenced based research, which concluded that increasing the number of higher educated nurses improves patient outcomes. This project is an integrated review of literature which investigates the effect of baccalaureate degree nurses versus associate degree nurses, in hospitalized patients, on failure to rescue, mortality rate, and length of stay. The results show that hospitals with a higher percentage of baccalaureate prepared nurses had decreased failure to rescue rates, mortality rates, and length of stay. The most significant finding was the decrease in mortality rate, as it was prevalent in each study included.

Couplet Care

Felicia Wedley, Michael Gilbert, & Lauren Reitz

Abstract

Rooming-in; what does it mean, what are the benefits, what is the impact on the newborn? This evidence-based practice project will explore these topics and explore how the implementation of this technique in facilities could benefit the newborn. Rooming-in is defined by the World Health Organization and the United Nations Children's Fund is "a hospital practice where postnatal mothers and normal infants stay together in the same room for 24 hours a day from the time they arrive in their room after delivery. The question at hand is "In Newborns, what is the effect of couplet care on overall health and bonding with the mother within the first seventy-two hours of life?" Potential benefits include improved breastfeeding, reduced newborn stress, and a decreased need for medication in newborns with complications.

Phantom Limb Pain Mirror Therapy vs. Pharmacological Therapy

Rylee Craycraft, Chelsea Small, & Cheyenne Jones

Abstract

Approximately 80% of amputee patients, aged 18-65, experience phantom limb pain (PLP). PLP is a burdensome and relentless neuropathic pain. This Evidence-Based Practice (EBP) project explores the relationship between mirror therapy and its effectiveness on PLP compared to pharmacological therapies. A search of the literature using EBSCOhost found two systematic reviews, one quasi-experimental study, two opinions of expert committees and authorities, and one descriptive correlational study. The quasi-experimental study is limited due to its small sample size. The literature revealed that mirror therapy is still a relatively new adjuvant treatment for PLP. In addition, pharmacological methods have copious side effects with minute evidence to support their efficacy. Taking into account these issues, more research needs to be conducted to prove mirror therapy's superiority over other current methods of PLP management. Nevertheless, mirror therapy allows for a safe, cost-effective, and convenient adjuvant therapy with pharmacological methods in the treatment of PLP in amputees. Mirror therapy has the potential to be a widely used nursing intervention that allows for patient autonomy in pain management.

How does a sliding-scale insulin protocol versus a basal-bolus insulin protocol affect hyperglycemic patient outcomes and length of hospital stay?

Keri Ramirez, Haeley Stute, Megan Liebl, & Stephanie Ediger

Abstract

Abstract

Hyperglycemia, defined as a blood glucose greater than 140 mg/dl (7.8 mmol/l), is reported in 22-46% of non- critically ill hospitalized patients. There is a clear association between hyperglycemia and adverse patient outcomes including delayed wound healing, surgical site infection, and prolonged hospital stay. Furthermore, Type 2 diabetes is responsible for increased risks of morbidity and mortality. The research available for review indicates adherence to self-management practices such as exercise, diet, blood sugar monitoring, and medication usage is imperative for successful glycemic control. While several methods exist to achieve glycemic control, the basal bolus method is superior to the antiquated sliding scale method during hospitalization. Additionally, a diet low in carbohydrates and sugar and high in protein and fiber, combined with insulin therapy is most effective.

The Effects of an Imagery Intervention on Imagery Ability

Alex London & Robert Mather

Abstract

Athletes commonly use imagery to improve performance by mentally practicing a physical action without explicit physical movement. The ability to image is a trainable skill and a crucial factor influencing the efficacy of an imagery intervention. Previous research suggests that imagery ability and physical performance improve with the implementation of an imagery intervention, yet a time frame that improvements occur is unknown. The purpose of this study is to determine an appropriate duration of an intervention to improve the ability of generating images. Experienced golfers (n=14) were instructed to practice a personalized imagery script for 15 minutes, three days per week. Additionally, participants were asked not to practice any putting more than typical. Imagery ability was evaluated during each visit to the laboratory with the Sport Imagery Ability Questionnaire (SIAQ). Putting performance was assessed on 15 putts from a distance of 3.05m. Upon completion of data collection, two one-way repeated-measures ANOVA's will be conducted. Results will be obtained to compare the means of imagery ability and results of putting performance. In the case of significance, a dependent t-test with a Bonferroni correction will be conducted to determine when significant improvements in imagery ability occur. A Spearman's rank correlation coefficient will be conducted to analyze if a relationship exists between imagery ability and putting performance.

Sanctity and Self-Protection: Linking Moral Foundations Theory and Fundamental Motives

Breanna Wedde

Abstract

Moral foundations theory proposes that we rely on a set of moral intuitions when making moral judgements (Graham et al., 2013). The sanctity/degradation moral foundation serves to protect one from pathogens, and it is activated by events that indicate potential exposure to illness, such as sexual deviance, which leads to feelings of disgust. This foundation is also activated by foul smells and filth, which leads to harsher moral judgements of sanctity-related moral transgressions (Schnall et al., 2008). The fundamental motives model describes a set of modules that serve evolutionary functions and become activated to motivate behavior (Kenrick et al., 2010). The self-protection motive serves to protect one from harm, and it becomes activated by cues of danger, such as angry faces, and to pathogen exposure cues, such as visible sores. We will be examining whether activating the self-protection motive might lead activate the sanctity moral foundation. We expect that those who are primed with a threat (i.e., activating concerns of self-protection) will make harsher judgments of sanctity-related moral transgressions than will those who were not so primed. Participants will read either a story that primes self-protection (home invasion) or a control story (lost keys). They will then read a series of paragraphs of moral violations and rate the extent to which they find them morally wrong.

Social Awareness about Pedophiles through the Artworks of Graham Ovenden and Patricia Piccinini

Jesus Cruz

Abstract

In this paper, I will examine how contemporary artists in England and Australia address the psychopathology and known personality traits of pedophiles. It will explore the notion of pedophilia in each society, necessary steps of action in order to confront the issue and address community safety, such as mental health counsel for pedophiles and sex offenders and government enactment such as sex offender registries. Following, the examination of how contemporary English painter Graham Ovenden and the hyper-realistic multi-media Australian artist Patricia Piccinini address the issue of pedophilia in their respective societies. Many of Ovenden's artworks have been ordered to be destroyed by court order on the grounds of indecency. A convicted pedophile in the jurisdiction of England, Ovenden's work contains instances of child nudity and portraits that are deemed sexually alluring. Patricia Piccinini's hyper-realistic 3-D artworks portray figures of children being coddled, soothed, and otherwise interacting with figures which resemble otherworldly animals, or simply put, monsters. Her work captures the innocent essence of the child within opportunistic adult-child relationships. This research will make use of academic and peer-reviewed journals and periodicals as well as utilize the presented artwork as primary sources. The goal of this paper will be to address the psychopathology of pedophiles and methods to reduce sexual recidivism.

To buy or not to buy: Exploration of Historical and Contemporary Implications of Visual Media and the Formation of Identity

Ryan Addis

Abstract

The medium of digital media and print such as movies, television, books and magazines among others, has historically played an integral role in the construction of individual identity formation on a global scale. Identity is defined as being the fact of being who or what a person or thing is. This research examines the history of visual media and how it has shaped and molded our own views of ourselves through research and art making. Using historical and contemporary artworks by artists who use identity as a theme in their work; I created artwork that is informed by historical approaches of visual media and appropriated present day use of digital media. I looked at contemporary artists such as Michael Reeder who is exploring the subject of identity. His work exudes an ambiguity and with that comes thought provocation, as he wants the viewer to question the sense of self. By referencing the current field of New Media arts, I have developed contemporary artworks that have been inspired by visual media used to influence identity development. With the use of contemporary advancements such as Photoshop and canvas printing, I have been able to create artwork that fits within the contemporary art discussion. This study has helped me better understand how identity is created on a global scale and better develop my own artistic practice.

Appropriating Images: Creating a shared visual language in graphic design history

Amanda Horton

Abstract

Copying, plagiarism and ripping-off content are serious accusations for a graphic designer. However, there is a history of and a precedent for reusing and recycling imagery within the field. Art Chantry (2015) acknowledges that without an established visual language and the reuse of images, the postmodern era of punk and grunge graphic design would not exist. Where is the line between appropriating someone else's imagery and paying homage? When does an image become part of the vernacular and, therefore, acceptable for reuse as part of the larger sphere of building a visual language? According to Keedy (1994) this should never happen, and he claims that "the vernacular in design has pretty much played itself out." But has it? Reuse and appropriation are seemingly as pervasive as ever, resulting in an ebb and flow that will continue, perhaps forever, throughout history. If graphic designers rely on a shared visual language for effective visual communication, must there not necessarily be some reuse and appropriation of images? All design either builds on the past or rejects it; either way the past is important in developing a visual language. This paper will look at the history of appropriation, plagiarism, and homage in design in an attempt to understand the value of or conditions in which these practices are acceptable in the practice of graphic design.

Design History Less Traveled

Amanda Horton

Abstract

Since its inception the heart of instruction in graphic design history has been based on limited resources. Meggs' History of Graphic Design broke new ground when it was published in 1983 and has been largely adopted as "the textbook" yet it has been noted that it takes a western approach to design history and limits information on women and minorities, but this book is not alone in its approach. In 1991 historian Martha Scotford began to analyze and question the formation of a canon in her article "Is there a canon of graphic design history?" the result of her study has encouraged exploration of contributions outside of the canon of western, male dominated contributions, and historians are taking up the call to action. But movement in this area is slow and we must wait for research to be completed and published. This paper proposes a student driven solution with a research project, "Design History Less Traveled" where students are encouraged to conduct and present their own research into design history not found in textbooks. The goal of the project is to engage students in in-depth research, while also exploring new topics and ideas outside of the canon of design history.

Nakagin Capsule Tower: In Pieces

Katie Her

Abstract

Built in 1972 by Kisho Kurokawa, the Nakagin Capsule Tower is one of the few structures remaining that embody the Metabolist Movement. The metabolist began their manifesto in the 1960s, which involves regenerative megastructures that allows for fluid adapting purposes of the evolving society as well as unforeseen tragedies such as the Great Kanto Earthquake and the nuclear bombings in World War II. Adhering to metabolist beliefs, Nakagin Capsule Tower had 144 individual units with basic amenities including an integrated bathroom unit, kitchen stove, television set, a toothbrush, and others but it is relatively small and limited in space. Metabolist beliefs and architecture were popularized after the Osaka Expo in 1970, but their fame quickly faded due to rapid urbanization and radical beliefs. Tokyo's economic boom in the 1980s resulted in mass production of high-rise buildings that provided more spacious and modern areas for people to work and congregate in. The glamour of the Nakagin paled against the chic, glittering glass pane high rise builds. Therefore, leaving the Nakagin in a state of disrepair due to neglect and extravagant price to maintain and restoring the building. Since 2015, there has been a growing movement to officiate the Nakagin as a historical monument as well as restoring the building to its proper glory, but its fate is still undecided.

Oliver Goes Off World: Augmented Reality Learning

Adam Coe

Abstract

Studies have shown that children retain more information when taught in an entertaining way. Learning from a workbook, while informative, has been shown to be not as effective as interacting directly with the subject. The Oliver Goes Off World project aims to increase children's comprehension on the Solar System, an intangible subject. The project consists of an illustrated book and an app that uses augmented reality (AR) to let kids interact with the subject directly. Each page uses AR to create an experience that gives readers an opportunity to explore and see space like never before.

Unfortunately after completing the creation of the book, I discovered my original plan for the app's development does not work and is too costly for this project. However, I offer the information that I have researched and discovered to share for others to use.

The Making of Moral and Ethical Choices in Design

Abbas Johari

Abstract

This presentation will provide literature about moral and ethical judgment in the early stage of design for the Ethics-centered Design paradigm --"Making the design analysis through" in lights of the critical and moral thinking. It covers difficult questions on how the designers need to search, understand, analyze, and resolve difficult moral and ethical questions early on in design. The questions focus on cases in which the consequences of design are not neatly separable into good or bad, but are mixed.

The work has used a critical review as its research methodology to obtain its findings.

The Development of Tough Cookie: Building Mentally Tough Kids as a Successful Small Business and Practical Educational Program

Katherine Pitzer

Abstract

After the development of the program Tough Cookie: Building Mentally Tough Kids, the feasibility of the program as a small business was explored. There are many challenges getting into the public school, private school, and home school programs, from budgetary restrictions to syllabus requirements. This study analyzed the best possible way to reach as many students as possible, in order to increase the impact of the program. Through interviews with athletic coaches and school administrators, the program was developed in order to increase mental toughness in children in a simple, effective way while making it financially responsible for schools to include in their yearly budgets. Finally, a strategic marketing and sales plan was researched with the goal of getting Tough Cookie to every student in Oklahoma.

So Close, Yet So Far.

Ashlin Penn

Abstract

This Picture depicts a homeless woman in a moment of vulnerability. It has to deal with Tragedy and Grief. A woman who is probably very hungry, so close to food, but not able to eat any of it. This Woman probably did not want to be photographed in a time of her life such as this one. Furthermore, the photographer would rather capture this moment of despair, than one of joy and gratitude from a contribution to her situation. I do not know if the photographer bought her a meal, or gave her any money. However, This photo goes to show the priorities of the media and the cruelty of society. It also depicts the contrast between need and surplus. Imagine the amount of people who simply walked past and quickly forgot about her. Even so, the people inside the restaurant enjoying their meal, contrasting someone else in dire need several feet away.

Celebrity Focus

Madison Dirickson

Abstract

I agree with most of the responses that I got. A person's imperfections should not be edited out because they are not a distraction. They are part of who the person is and are essential to showing us the essence of that person. Seeing photoshopped photos don't make people feel good and gives them this impossible standard to reach that makes them feel bad about themselves. These photoshopped photos can be considered a form of propaganda because they are a lie and depict something as something it is not. Everyone agrees that this focus on celebrities in our media is not good and occurs way too much.

The financial burden upon collegiate music students

Anthony Valentine

Abstract

In today's society a student being able to attend and complete a college degree largely relies on the financial class of their family. Students that come from middle/upper class families are statistically more likely to graduate. While college students that come from low income families are much more likely to drop out. Being a normal college student alone can be expensive, with cost of tuition, fees, books, and living; But being a music major in college can be monumentally more expensive in addition to the standard college expenses. Just one of the financial burdens on Instrumental music majors is having to provide their own instrument or invest in one that is better quality than the ones they have, this can be an investment that ranges from 3,500-15,000 USD. This research is aimed to find solutions for universities music departments, private music instructors, classroom professors, and the student themselves to achieving the goal of a music degree for the more obtainable and unhindered by the extra financial burdens of music. Lowering collegiate dropout rates for instrumental music students that come from low income families or impoverished areas. To achieve this goal, I plan on interviewing professors that have dealt with these students before. Also interviewing music students that may come from that demographic, and how they succeeded or why they did not. Through personal experience I've seen freshman music students dropout due to financial issues.

Benefits of Music Therapy Services in the Hospital Setting

Morgan Corona

Abstract

The purpose of this literature review is to demonstrate the benefits of music therapy services in the hospital setting. Music therapy services can be used in various units of the hospital such as surgery, OB, pediatrics, emergency, etc. During their stay in the hospital, patients experience anxiety, stress, and pain for which music therapy can provide relaxation and pain management. Music therapy can provide procedure support for various medical procedures. Receiving music therapy services is also shown to contribute to shorter length of stay in the hospital. This literature review consolidates research from these various aspects of patient wellness and demonstrates the benefits of music therapy services in the hospital.

Teaching Social Media Use and Information Literacy in the Basic Communication Course

Sarah Turner McGowen

Abstract

Social media has played an important role in political discourse, from the organization of social movements to the spread of misinformation in American elections. Additionally, Americans rely on social media to get their news and to debate important issues: Gottfried and Shearer (2016) note that 62% of U.S. adults report getting news from social media sites, in addition to more traditional news sources. Further, Macafee (2018) has found that social media use has a moderating influence on offline political participation, meaning how an individual assesses the significance of information found through social media sites is related to political action (such as engaging in further discussion). While information literacy is regularly taught in college classrooms, it is important to equip students with the skills necessary to distinguish credible sources from non-credible sources (Kurbanoglu, Akkoyunlu, & Umay, 2006; Meyer, Hunt, Hopper, Thakkar, Tsoubakopoulos, & Van Hoose, 2008). This learning activity is designed to engage students in social media information literacy, particularly focusing on the identification of social media posts that include references to external sources and credible references through the internet. I will describe an in-class activity, how to debrief students following the activity, and an appraisal of how the activity has worked in the classroom in the past.

Code-Switching and Communication Patterns: An Ethnographic Study of Emergency Medical Technicians

Elaine Davies & Dusten Lynn

Abstract

Abstract

The ability to communicate effectively and efficiently is important in a variety of workplaces, however in the medical field, strong message construction skills are vital. As first responders, Emergency Medical Technicians (EMT) must converse simultaneously with patients, other first responders, and medical professionals as part of their job. For example, they need to gather information from a victim in an uncomplicated fashion, but also relay that data to the area hospital staff using standard medical terminology. Therefore, this study examines how the use of code-switching occurs in the daily routine of EMTs. Specifically, we use an ethnographic methodology to explore what types of communication patterns emerge during course-mandated, clinical observations for EMT students. Observations took place over three, 12-hour shifts. Results indicate that the participant-observer witnessed and engaged in downward, upward, and horizontal communication patterns, often within the same “call.” The findings lead to the implication of the necessity for communication training for EMTs, specifically in the areas of interpersonal communication and professional communication.

Reporting on Race: The Depiction of Black Oklahomans

Savannah Melher

Abstract

The purpose of the study was to further scholarly research regarding depictions of race and the media. Studies prior to mine focused primarily on politics and how news stories favor one candidate over another or political party. Thus addressing how the media can be a tool for gaining political preference. The same can be concluded after considering race in news media as I have found specifically in Travis Dixon's 2015 Color of Change project. Upon completion of a content analysis the issue of stereotyping people of color as criminals or victims in Oklahoma's print news coverage from January to March, June and July for the years 2019 and January to March in 1989. Specific categories within news stories were coded to quantify the frequency of crime reporting. The criteria included: race, gender, indicator, and the crime/victim. The results of the content analysis produced an overwhelming percentage of news reports for the time period focusing on black males as murder perpetrators. When compared to local statistics, The Oklahoman reported significantly more on black man than the average amount reported in 2018 crime reports. Overall, the small sample produces a need to broaden the time frame of research.

Just Reading for Fun: Viewing Perceived Credibility Through the Lens of ELM

YanJun Zhao

Abstract

This study used the Elaboration Likelihood Model to explain people's news consumption. Specifically, it is an effort to answer these questions: When are people more critical on possible fake news? When do they do fact check of the news? This study is an exploration research on people's perception of health-related news shared by WeChat, the most popular social media in China.

Photo Manipulation

Will Lovelace

Abstract

Scrolling through pictures on Google I came across this picture of a red stag, being a hunter this picture stuck me as interesting. You can tell clearly that the animal itself has been edited as well as the background scenery. I enjoy the work they did to the animal in the picture, enhancing and changing the horns into tree branches or roots. These effects help the picture and the animal look bigger as a whole, which I like. One of the things I do not like about the picture is that it looks like it was taken in a foggy city park. This takes away in my opinion from the majesty of the animal, the feel that it is not in its natural environment. The focus is on the the animal but the leaves blowing helps enhance the environment and setting of this photo. This picture causes little to no truly ethical issues, but the picture itself has been manipulated to make the animal more physically appealing when you see the picture printed out. Red stags have a large set of antlers on top of their heads that some people could confuse as an actual tree. Their antlers are majestic and should be enjoyed for their true beauty. If someone would try to sell a hunt on an animal that looked like that and actually had someone dumb enough to purchase a hunt to kill a potential giant, they could be liable to give someone their money back due to there not being any stag that look like that or grow that big. If this picture is truly analyzed at face value it is a great picture of a beautiful an

When Photoshop Attempts to Define Reality

Alexis Hagen

Abstract

This is a before and after photo of Katherine Heigl one can only assume is for a magazine or portfolio. The controversial issue with this image is the obvious change in physical appearance. In the after photo she is shown to be skinnier and have more curves. She has more cleavage in the after photo. Her skin tone and hair tone is brighter. Her jaw is more defined and her makeup is more prominent. The argument against Photoshopped images is that it gives a false perception of reality. The argument in support of Photoshop is that this makes the image more visually appealing and the general public prefers this perception.

The ethical issue among these types of photos, simply lies within the ignorance of the general public. Because most people don't take the time to truly digest what images they are taking in, they do not realize how quick and easy it is to change how a person looks in a photo. Therefore, this public believes that is how beautiful people are supposed to look and begin doubting their own self-image. These types of photos are often seen as harmful to society because it gives a false perception on how people actually look. The main argument for people who Photoshop these photos is plainly: This is what sells. If people did in fact have issues with these photos, they would not buy them. So while yes, the ethical issue still lies...it doesn't seem like the general public has a problem with it.

Difficult Pictures

Abbie Lambert

Abstract

This picture is from The National WWII Museum and it is titled 'The Holocaust'. It is a very powerful photo that causes a lot of strong emotions. The way pictures like these are presented in a way that shows the hardships of c concentration camps. The Third Reich attempted to hide the truth of how badly humans were treated in the Concentration Camps. Once pictures of this caliber were released a lot of people were upset about the conditions. This was difficult for people to view because it is so real and overall upsetting. The truth of our history is difficult and some people believe that seeing that truth somehow tarnishes the human condition. A large group of people are too uncomfortable with pictures like these and the rest of people are under the belief that honesty and truth is how we don't repeat atrocities of this extent. The time of this picture was a period of bigotry, discrimination, and injustice. The two sides of this coin are really is this picture too difficult to view or do we as humans NEED to see images like this to understand the gravity of how bad the world can be.

Unethical Issues in Photojournalism

Kobe Louis

Abstract

This picture is an example of picture manipulation. It is often used in magazines and ads for beauty products. They take a regular picture of the model, then they do a lot of editing making the model look like a whole different person. Most of the time they do this to promote the product they are trying to sell and to make the buyer think that the product will make them look like this. It works in favor of the companies using this technique because it gets the consumer buy the product thinking they will look like this. They see this picture and think that they have to look like this. It is unethical because it is not the real picture.

I chose picture manipulation because I feel like this is one of the most used unethical issue in photojournalism. This does not only happen to women but also men. When people see these picture like this it make people feel bad about themselves. People think that they need to look like this because of the ad. It also sets a standard that all women need to be beautiful to be attractive which is not true. For men they usually edit them to look tone and fit. Which makes guys think that they need to look like that to be attractive. Because of photos like this people try too hard to make their appearance look better. These companies really need to stop using digital manipulation because it is hurting the consumer more than doing good.

The Ethics of Photo Manipulation

Glen Archer

Abstract

This image shows President Abraham Lincoln's head photoshopped onto the body of another politician. The argument against this is that it can be misleading to an audience who has never seen the original image. This argument applies to all photos that have been altered in this way. It is, however, defended by some because it is art and people should have creative freedom. This ethical dilemma in photoshopped pictures has been around for a very long time, the above photo being one of the earlier displays of it. Many people think it is wrong and misleads viewers, whether it be changing who is in the picture, adding or removing things, or making a person look better or worse. This is part of creative freedom, but can cause confusion and, in the worst cases, harm to some.

Photo Manipulation

Taylor Smith

Abstract

I believe edited photos like this are very detrimental to young girls and boys and adults as well. Society profits off of our insecurities and imperfections and we are made to believe that our bodies need to be altered like those in magazines when truthfully, those people don't exist. They are composed of Photoshop and lighting and society's idea of a perfect body and perfect skin tone and it is not okay. We are all real people with real bodies and real feelings and being told our bodies do not fit the norm are not okay and are unrealistic. I picked this particular photograph of Zendaya because of how she outed the magazine for their cruelty and desires to make money and appeal to their outdated and unrealistic ideals of beauty. She stood up for what she believed in and thought of the minds of young girls who look up to her as a role model and I admire that about her.

Picture Manipulation

Makinley Kennedy

Abstract

Pictured above is Filippa Hamilton, a past model for the Ralph Lauren Fashion Company. On the left, she is depicted in an advertisement that was mass produced in Ralph Lauren stores across Japan as well as on numerous websites. In contrast, on the right, she is in the flesh walking down the runway. When I first encountered this photo, I was completely astonished at the manipulation that had been done to it. As a child, my oldest sister had an eating disorder and the doctored photo above was her actual body. Therefore, this picture instantly hit home for me and the message that it had to offer. Photo manipulation, when used to alter one's body, is completely unethical. I strongly believe a picture is worth 1,000 words; therefore, every photo has a point to make, and when this message is changed without the subject's consent, injustice has occurred. Models, who have their figures changed without their knowledge, are being forced to represent an idea that beauty is attained through impossible standards. This, in turn, also means they stand for millions of viewers to have body image issues and insecurities. However, models are not immune to low self-esteem that is coupled with digital doctoring. When they witness their heads being bigger than their waists, they begin to question their own appearance and whether or not they are good enough to be considered beautiful. Photo manipulation, although is said to make someone beautiful, is truly one of the ugliest practices.

Bonnie and Clyde Death

Jacob Smith

Abstract

This picture reveals the aftermath of the deaths of the famous gangster couple, Bonnie and Clyde. The couple was ambushed and shot to death by local police officers and Texas Rangers on May 23, 1934. This picture was taken sometime after the ambush. I'm not sure if this picture was released to the public at the time or not, but needless to say it is a gruesome picture. I do not think there is much controversy over this picture, but one could argue on why would someone take this picture of two dead bodies in the first place. One point of view, of someone who dislikes the picture, could be it seems too violent and disrespectful to be taking pictures of two broken dead bodies. Another could argue, that perhaps the picture could be used for documentation or for some sort of police records. And maybe the everyday people need to see proof of these two criminals dead.

American Veteran

Erica Wilson-Traxler

Abstract

This is a picture of a veteran who participated in a 60-hour marathon endurance test for extreme fitness people called the Agoge. It is a Spartan Race that was modeled after the original Spartans. This is Earl Granville who participated with a five-man team of wounded military veterans in the race. This veteran lost his leg while serving his country in Afghanistan.

Cropping this photo made it seem larger. They zoomed in, which made the body seem bigger, cut off the hat, and part of the prosthetic leg. They also completely changed the logo on the shirt. The new picture makes it seem that this person is probably a veteran and doesn't stand for disrespect to the country or flag. They stand proud and tall against all enemies foreign or domestic even now with disabilities. This picture is unethical because it misrepresents this disabled veteran. The shirt says "I don't kneel" which could mean that because he served his country he would never "disrespect" the flag like others have by kneeling. The original picture shows strength after struggle. It shows determination, motivation, dedication, and accomplishment. The altered picture is giving an opinion on a stance, where the original shows conviction.

Another Surprise: The Senselessness Behind a Picture

Linda Wood

Abstract

This study is on the photo of Kendrick Johnson, a 17-year-old high school student who was found dead rolled in a gym mat in one of Georgia High schools. This a senseless murder. I read that the students would hide belongings in or around the mats so no one would steal them, to keep from paying to use a locker. Out of all the people in the gym, nobody was concerned, when he did not walk out the gym hours later. Nobody heard his cry for help in that gym. What happened to the teachers checking the gym before lock down? Why did it take 24 hours to realize he was missing? The researcher of this study interviewed some college students about this issue.

We Are Here! We Are LGBTQ! Get Used to It!

Syuan Huei Wu & Jueun Lee

Abstract

On May 24, 2019, Taiwan became the first nation in Asia to legalize and perform same-sex marriage. Amid the legalization, there are still limitations for same-sex couples which include adoption and family planning. In socially conservative South Korea, being LGBTQ was often seen as a disability, mental illness, or a sin. In January 2020, a case of a male soldier, who had undergone sex reassignment surgery, was discharged from her military duties. The case has sparked a wider discussion about LGBTQ in South Korea. In their poster presentation, Syuan Huei Wu from Taiwan and Jueun Lee from South Korea will address the history of LGBTQ movement. The presenters also hope to have a conversation about LGBTQ issues in Taiwan, South Korea, and in the USA with the hope of learning, raising awareness, and finding a common ground on long-overdue LGBTQ laws and conflicting viewpoints.

Of Dashes and Hyphens: The Mysterious Dash Forms Three

Kimberly Frey

Abstract

Due to the fear of professoratorial censure and a lack of emphasis on using various forms of punctuation in writing classes, many student writers rarely look beyond the period, comma, and semicolon for their punctuation needs in their writing. However, other punctuation like the em dash, the en dash, and the hyphen can also perform effective rhetorical functions equally as well as the ones with which they are more familiar. The author of this research explores the different rhetorical functions among the three less used forms of punctuation (the em dash, the en dash, and the hyphen) and explains how and when student writers should use them for achieving a better rhetorical effects in their writing.

Photo Manipulation

Adrianna Finch

Abstract

The picture that I choose shows how a woman looks in real life versus what they look like on the internet after she changed the picture to make herself look smaller and flawless instead of what she looks like in her everyday life. The photo is heavily edited. The woman edited her photo so that she looked skinnier and had more pronounced eyes than the original version. She had her lips look fuller and more pronounced. The only thing that she did not edit was the mole that she has on her upper lip and her clothing/hair.

The argument for this picture is that she is able to look perfect which will improve her status on social media. If she has so many followers and so many likes, she is more likely to get a sponsorship to support herself. She is more likely to attract attention to the company that sponsors her because she is so attractive in the right picture, which companies like because it causes their profits to increase. It is also an ego and self-esteem boost for this woman because she is getting likes and validation from people, even if she is not showing them who she actually is. The argument against this is that she is lying to everyone who follows her and believes what she says about any products or companies that she promotes. If any of her followers were to find out that she was editing her photos to this extent they would lose trust in her and stop believing in the products and companies that she has promoted in the past and might in the future.

How People Feel about Picture Manipulation

Cheyenne Price

Abstract

I asked five people five questions about their thoughts about Picture Manipulation within the Media. Four out of five people have seen the good in Picture Manipulation, and five out of five have seen the bad in Picture Manipulation. Four out of five people do not like Picture Manipulation, while one person is in between the negative and positive feelings. Five out of five can see the harm that Picture Manipulation can do. Five out of five people are able to see how Picture Manipulation can badly affect the public, but one person says that not everyone can be negatively affected by it. Two out of five wish for it to be banned, one out of five says no because it could do some good (like taking blemishes off a person's face), and two out of five think it is unethical and should be frowned upon and be regulated.

Photo Manipulation

Kaylee Rodriguez

Abstract

Photo manipulation is a broad subject that is not limited to the falsification of models or celebrities. However, that is the topic I would like to focus on, because I think it is relevant to today's society. Body positivity is a huge part of our culture in today's world. For this reason, editing images with unrealistic standards and proportions is hugely frowned upon. However, with the advancement of technology, photo manipulation tools are available to just about everyone. To put things in perspective "...67% of people admit to retouching the pictures they post." (Psychology Today), and that is just the ones who admit it. What makes this so scary is the fact that it is so common it often goes undetected. The phenomenon can likely be linked back to pictures like the one I have provided, it started with actors, celebs, models, etc. but now has found a way to most teenagers. Of course, this raises the issue of low-self esteem among teenagers and young children, because now it is not just famous people who look "untouchable" it could be the person who lives beside you, or a peer. On the flip side photo manipulation can be used to enhance pictures and bring them to their full potential. Another benefit is the positive feedback that photos that utilize this tool get. Photo manipulation, however, is just that it is an enhanced version of an object, person, etc. Therefore, is usually separate from reality, or in an easier explanation not real life.

Inside the Language of Orange is the New Black

Megan Green

Abstract

Orange is the New Black is one of the most successful series Netflix has ever produced. Both popular and complex, it highlights significant issues within American culture today while simultaneously offering a beautiful and funny account of a wide array of female characters who are both dynamic and insightful. The way these characters use language throughout the series illustrates many of the unique ways contemporary American women use language to strengthen their relationships with each other. These patterns of language use are discussed thoroughly in linguist Deborah Tannen's *You're the Only One I can Tell: Inside the Language of Women's Friendships* (2017) and can be used as a lens for analyzing conversations among characters within Orange is the New Black. For this project, I focus on specific behavioral patterns discussed within Tannen's book such as troubles talk, metamessages and sameness. My research shows how the interactions between women prisoners in the series demonstrate many of the elements of gender-specific language-use patterns discussed by Tannen. As such, it testifies to how important this series is for showing women in an authentic light. My research also raises questions about the ways socio-economic status, race, and the specificity of the prison setting, which Tannen may not be familiar with, may play a role in shaping these linguistic behavior patterns.

Drinking the Rhetorical Kool-Aid

Kristi Celestine

Abstract

This presentation is a rhetorical analysis of different cults and their leaders, such as Charles Manson, Marshall Applewhite and Shoko Asahara. I will look most specifically at Jim Jones and David Koresh to try to get an understanding of how their religious beginnings and their "god-like" personas led them to gather so many loyal followers. I will take a closer look at their rhetorical strategies and how those strategies were used to lead their followers. Finally, I will look at and discuss more contemporary groups and political entities in the United States that have developed their own cult-like followings. I have used Lloyd Bitzer's definition of rhetoric as well as J. G. Melton and R. L. Moore's definition of the word cult as the base for this project. I believe this research is important because uncritical belief in a strong leader, whether religious or political, can lead normal society into a cult-like following. My hope would be that with this information, everyday citizens will see the signs of potentially fanatical leadership and steer clear of those leaders. I will also discuss the gap in academic research related to the rhetoric of cult leaders in the hope of encouraging future researches to delve deeper into the subject.

Why We Dream What We Dream

Rebeka Bobocka

Abstract

Have you ever thought about the meaning of your dreams? There are many theories by scientists about why people and animals dream. One of the theories claims that dreams are imaginations, impressions, and emotions that we have collected during the previous day and gathered as an image in our minds. So can we control what we dream? In her poster presentation, Rebeka Bobocka will unpack some startling research findings to ascertain whether this theory is true.

Malaria in Malawi

Kenzie Stricker

Abstract

Every two minutes, a child under five dies of Malaria in Malawi. Malaria is a protozoan parasite that invades the red blood cells, which is transmitted by mosquitos. Symptoms include chills, high fever, sweating, pain in the abdomen or muscles, impaired consciousness, abnormal bleeding, convulsions, and organ disfunction. I am going to research the negative affects it has caused on the children in the country of Malawi. I went to the impoverished village of Ngodzi and saw how the people were affected, especially children, by Malaria. There are several different methods of fighting Malaria in Malawi, some example are pre-natal medication, Malaria treatments, mosquito nets or spray, and more medical clinics.

Mental Illness Takes Over College Students

Bailey Bittman

Abstract

Mental Illness Takes Over College Students

Studies have shown that a quarter and a third of students meet the criteria for anxiety and depression during their college years. Mental Illness is a health condition that is associated with distress or problems with social or work events. Many college students suffer from mental illness and they are so good at hiding it that no one can tell they are going through something to be able to reach out to them. I want to learn more about it, what causes it and what to do to help someone who suffers from it.

the impact of Mass Shootings

Rollin Richard

Abstract

Why do mass shootings happen? In this presentation I will be researching and using news reports and findings about how mass shootings affect people in their everyday life, why do people commit mass shootings, and what we the people can do to stop these mass shootings from happening.

Children Vaccinations: Why do Some Parents do and do not?

Garrison Long

Abstract

Why are children and even some adults getting diseases that are “old diseases” and should not be contracted? With the presenter’s findings, he will explain why parents chose to vaccinate the children and some who do not vaccinate. First, he’ll explain that the people have the right to vaccinate themselves and their children if they chose to do so, and the people also do not have to if they do not find it necessary. The people that do not, have that right, but they can be persuaded that it would be a good thing. They can even add some years to their life span if they get or should get vaccinated.

Animal Testing Equals Bad News

Jenna Keeler

Abstract

Animal testing in cosmetics and household products have become a big problem in the United States. Did you know that animal testing started in 1938? We have come a long way since that decade, but unfortunately this subject is still a crisis. Not all beauty brands are cruelty-free. The presenter would like to find out why we are still testing on animals, where is this happening, whether it has been a "boondoggle," and how can we put an end to it for good.

Reference: <https://www.peta.org/issues/animals-used-for-experimentation/animals-used-experimentation-factsheets/animal-experiments-overview/>

Alzheimer's Awareness

Yuli Zatarain

Abstract

In the United States alone, approximately 5.8 million people have Alzheimer's disease, and more than half of those affected die. Alzheimer's is a known disease by name alone because it affects the elderly mostly those above the age of 65, but people don't have any knowledge of the symptoms and how it affects the brain and body. Taking care of someone who has this disease is not an easy task. It is very hard and overwhelming when a patient succumbs to their symptoms, but the more you know the better a person can provide care for someone battling this life changing disease. My goal for this project is to simply educate people about what Alzheimer's does to someone and what they can do to help.

Depression Among Adults in The United States

Cynthia Zapien

Abstract

Helathline.com states that sadness and grief are normal human emotions. We all have those feelings from time to time but they usually go away within a few days. However, nearly one in twelve adults' report having depression in the United States. In her poster presentation, Cynthia Zapien will discuss the causes of depression or reasons that lead up to depression, the signs and symptoms of depression, and treatment options.

Ocean Pollution and How it is Affecting

Mireya Hernandez

Abstract

Have you seen the Great Pacific Garbage Patch? It is a result of people who have carelessly dumped trash every day without thinking about the harm they are causing to all the innocent sea creatures and even us. If we do not start taking care of our oceans now, imagine how it would look like ten years from now? In her poster presentation, Mireya Hernandez hopes to share her interesting research findings on what is ocean pollution, how ocean pollution is affecting sea life and us humans, and what can be done to put a stop to ocean pollution.

Not Prepper but Present: Thoreau's Anti-Apocalyptic Dissent

Kate Huber

Abstract

Henry David Thoreau is often seen as a champion of what Timothy Morton calls “over-yonder” nature, an idealized wilderness separate from humanity, but he is simultaneously criticized for failing to get far enough away from society. Many readers imagine Thoreau’s goal is to survive in a hostile wilderness. They compare him, unfavorably, to extreme outdoorsmanship as well as to “survivalists” preparing for some apocalypse. This paper argues that Thoreau’s popular association with doomsday preppers overshadows Walden’s present-tense social commentary by shifting focus toward surviving a future conflict between humanity and hostile nature. While life after the collapse of society is more challenging than Thoreau’s experiment at Walden, survivalism is often fake preparation for an imagined dire scenario while Thoreau advocates real action in a non-hostile natural environment. Moreover, while Thoreau’s sojourn to Walden may seem like a return to the settler colonial past that survivalists fantasize about, Thoreau is seeking societal change in the present. When addressing the subject of climate change, environmentalists can take a lesson from Thoreau’s anti-apocalyptic dissent. Instead of surviving the end of the world, or retreating into some idealized version of nature, we need to shape society into the world we want to see, a process begun by Thoreau in his experiment in living deliberately.

Mental Health Epidemic Among College Students

Luis Mata

Abstract

According to activeminds.org, 39% of students in college experience a significant mental health issue and 40% don't seek help. In his poster presentation, Luis Mata will share his findings on what is mental health, why mental health issues among college students is becoming more prevalent than in previous years, and what colleges counselors can do to help students from this so-called "anxious generation."

Cyber Bullying: The Impact on Adolescents' Lives

Yaqeen Aldubaisi

Abstract

Cyberbullying is a form of bullying or harassment using electronic means. In other words, it would take only one click to ruin a kid's life. A recent study shows that about 37% of young people between the ages of twelve and seventeen have been bullied online. In addition to that, 30% have been bullied more than once. It has become increasingly common especially among teenagers where they bully or harass others on the internet particularly on social media sites. In her poster presentation, Yaqeen Aldubaisi will address the definition of cyberbullying, the different types of cyberbullying, why teenagers cyberbully others, and how cyberbullying can be stopped or prevented.

The Effects and Implications of Abortion

Kimberly Javorsky

Abstract

In 2017, without including miscarriages in the totals, 18% of pregnancies ended in abortions, and in that same year it was estimated that 862,320 abortions were performed in the United States. Ever since Roe v. Wade in 1973, arguments have circled around the topic of abortion. In this presentation, Kimberly Javorsky will discuss the emotional effects that abortion can have on the women who receive them. Kimberly will also address that abortion is a human rights issue, not just a religious moral dilemma.

Cyber Bullying: The Impact on Adolescents' Lives

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Roles Abuse Can Play in a Child's Life

Abbigale Bilyeu

Abstract

In 2014, it was reported that an estimated 1,580 children died as a result of abuse and/or neglect. About 80% of 21 year-olds who were abused as children met the criteria for at least one psychological disorder. In her poster presentation, Abbigale Bilyeu will address the definition and types of child abuse, the long-term psychological and physical effects of child abuse, and prevention strategies.

Eating Disorders Affecting American Teenagers

Georgia Miller

Abstract

Eating disorders have the highest mortality rate of any mental illness. Nearly one person every hour dies as a direct result of an eating disorder. In their poster presentation, Georgia Miller and Rebecca Lau will unravel the true effects of an eating disorder regarding American teens and their symptoms that come along with the illness. The presenters will provide research evidence and personal experiences regarding eating disorders affecting American teens today.

Green Energy: Can Windmills Prevent Global Warming

Anders Strand

Abstract

Can windmills save our future? The way we produce energy today is damaging our earth's atmosphere; therefore, increasing the temperature of the earth. According to research, windmills generate the so-called green energy, meaning they don't emit any pollution into the air. In his poster presentation, Anders Strand from Denmark will explain the meaning of "green energy" as well as non-renewable energy. Anders will also address the advantages of using natural energy such as windmills as opposed to non-renewable energy so that we, our children, and our children's children will still have a future on this planet.

An Outdoor Venture: Service Learning with the Guide to the Wichitas

Kimberly Frey

Abstract

In spring 2018, the Friends of the Wichitas, a group dedicated to supporting the Wichita Mountain Wildlife Refuge in Indianahoma, OK, approached our university about updating the Outdoor and Trail Guide to the Wichita Mountains of Southwest Oklahoma by Edward C. Ellenbrook as a student project. The guide includes information on the history, culture, hunting, and angling of the refuge along with the trails available to the public. Groups of students have worked on the guide each semester, tackling the various aspects of this collaborative project. The process involves interacting with the Friends group, the Ellenbrook family, and other stakeholders. The project is a large service-learning project (e.g., Knapp, Bradley, & Fischer 2010) with multiple stakeholders and an indeterminate timeline. The guide project is an opportunity for students to get practical experience editing and updating a book in a learning, and therefore more forgiving, environment under the supervision knowledgeable and supportive professionals.

Twice Exceptional (2e) Gifted Students and 2e Special Education Services in Taiwan and the United States of America

wanchen wu

Abstract

Research states that the ideal classroom environment for the twice-exceptional student is very far from what exists. Often known as 2e students, these students are twice exceptional-gifted, but at the same time, they are also negotiating a learning disorder or attention difficulties. Studies also show that 2e students perform better when they receive a combination of gifted programming, as opposed to solely special education services. To meet the needs of these children, there must be a paradigm shift from a remediation or deficit model to a strength-based model of education. In her poster presentation, Wu wan-chen from Taiwan will discuss who are 2e students, what are the similarities and differences in 2e special education services between Taiwan and the United States, and how teachers as well as special education teachers can collaborate together to help 2e students thrive in their classes.

Faust vs. Faustus: Sinners of Their Times

Laura Blackstone

Abstract

This research is an analysis of Goethe's "Faust" (1800s) and Marlowe's "The Tragical History of the Life and Death of Doctor Faustus" (1590s). This is a multi-stage project with this presentation covering a comparison of the plays regarding their structure, plot, and theme. Initial research regarding the plays' reflections of their societies will also be discussed.

Patch-Burn-Grazing in the Plains of Oklahoma and Missouri: What's are the Advantages and Disadvantages

Dalton Westover

Abstract

According to NRCS, patch-burn grazing is the application of prescribed fire and livestock grazing used to create a shifting mosaic of fire and grazing across a landscape that varies annually. The goal is to increase the diversity and structure of the vegetation in a way to benefit wildlife and maintain livestock production. NRCS also stated that historically, only a portion of a prairie would burn. Fires were either intentionally set by Native Americans or started by lightning. In his poster presentation, Dalton Westover will discuss the advantages and the disadvantages of patch-burn grazing. The presenter, whose family happens to be landowners, also hopes to enlighten his audience members how patch-burn-grazing helps many aspects to an ecosystem, including removing invasive plants and improving habitats and farmlands.

When Our State Was Red: Socialism in Oklahoma

Brooke Purkey

Abstract

A reliably Republican and socially conservative state in today's electoral map, Oklahoma boasts a history of radical activism during the years leading up to World War I and shortly thereafter. Organizers from the US Socialist Party descended on Oklahoma following statehood and found fertile ground for left-wing and communitarian ideas but also rural communities steeped in evangelical Christianity with very definite (and often contrary to orthodox Marxism) ideas about issues such as private property, prices, and local control. The Oklahoma Socialist Party was, during this period, the second largest political party in the state, due in no small way to its active recruiting of African American farmers and agricultural workers. This presentation will recount the story of the Oklahoma Socialist Party with a focus on Oscar Ameringer, a German-born labor organizer and newspaper columnist who disseminated leftist ideas to Oklahoma citizens.

A New Native Renaissance: Writers of the 21st Century

Hope Brown

Abstract

When it comes to Native American culture in modern day literature, no longer are they written as a scalping, war paint covered, dancing around a fire, people. Since the beginning of the Native American Renaissance, which started in the late 1960s, Native people have taken their narrative into their own hands in many aspects of the arts and most importantly the subject I will be touching upon, literature. In addition to the major social changes that were happening in post World War II America, Native Literature reflected those changes that were happening culturally to a people that had been displaced just a century prior. This identity turmoil also showed up in the works of those who are now staples in Native literature such as N. Scott Momaday, James Welch, and Leslie Marmon Silko, among many others. But how has Native literature changed since the Native American Renaissance giants published their works? I intend to explore how Native literature and its writers are a product of this new modern time that they live in. 21st century Native writers have grown farther from their ancestors' world than what earlier writers wrote about. Modern Native American writers such as Tommy Orange, Erika T. Wurth and Rebecca Roanhorse, are just a drop in a very large body of water filled with Native writers who have set a new narrative for Native writing and are essentially no longer restrained to just "Native American Literature."

Spell Binder

Carson Sommer

Abstract

Spell Binder is a fantasy novel that deals with the themes of family, revenge, abuse, and purpose. The main character goes on a revenge quest to bring the man who raised him, Toren, to justice along side his childhood friend, who Toren also wronged. Through the experience, the main character comes to terms with not only his past and the abuse he suffered at Toren's hand, but his complicated feelings toward his father figure, as he simultaneously resents and looks up to Toren, and he comes to terms with how similar they are. He learns not to define his life based on anyone else, and the cost of doing so. He learns, through watching his childhood friend deal with her trauma in a much less healthy way, just what the cost of hating someone is, and what it can do to you, that it poisons you and turns you into a different person. He learns to move past his trauma and truly take control of his own life.

Vaping and Juuling

Abdullah Alhawsawi & Ibrahim Almusalit

Abstract

You might be tempted to turn to electronic cigarettes (e-cigarettes, vape pens, and other vaping devices) as a way to ease the transition from traditional cigarettes to not smoking at all. But is smoking e-cigarettes (also called vaping) better for you than using tobacco products? The availability and use of electronic cigarettes or vaping in America and globally is growing promptly and is a phenomenon that involves both the youth and adults. In their poster presentation, Ibrahim Almusalit and Abdullah Alhawsawi will clear the air about vaping, the known and unknown dangers of vaping, and how to quit vaping.

Rethinking the Tools We Have: Unconventional Forms of Trauma Narratives

AsJa Cole

Abstract

Trauma theory gained widespread attention in the early 1990s as founding trauma theorists used previous research in the field of both psychoanalysis and psychology to outline the definition of trauma and to begin to explore the ways in which trauma affects our everyday lives. With this research, new definitions and ideals of how to define and diagnose trauma for an individual began to take shape. This inclusion of trauma-based diagnoses into the discourse has thus led to extensive research concerning the benefits of trauma narratives as a means of therapy for trauma disorders. In the creation of a trauma narrative, both the recurrence of traumatic memories and the negative influences created by them are addressed. While the benefits of trauma narratives are widely agreed upon, the endeavor to create a finished and successful trauma narrative as outlined by the discourse is a difficult one, built on prescriptive formatting guidelines and timelines. This project instead seeks to explore unconventional forms of trauma narratives to begin the process of overcoming trauma, such as the writing of prose poetry and the incorporation of artwork into the narrative, specifically in the form of the collage. The research presented offers that by creating a trauma narrative without borders, the trauma survivor is allowed access to memories and events that defy language and prescriptive rules.

Intersections Between Queerness and Religion in the Midwest: Christianity as Hyper- Marginalization for LGBTQ+ Community

Abigail Griffin

Abstract

Growing up in the Bible Belt, specifically Oklahoma, carries with it an air of menace for youth and adults that fall under the LGBTQ+ umbrella. Even today, in the aftermath of marriage equality, the Midwest is still stagnant in terms of progression. This immobility is coddled by the overwhelming number of Christian-affiliated spaces (churches, restaurants, boutiques), rhetoric, motifs, and paraphernalia packed into square footage. Not only do these things take up spaces of their own and give a sense of overcrowding to those marginalized by them, they intentionally creep out into LGBTQ+ spaces like Pride via protests or acts of saviorism. On an average day, even just a trip to one's neighborhood grocery store, one can pass more than five churches. This does not include bumper stickers, advertisements, salutations that one will undoubtedly come into contact with before, during, and after. Though these occurrences may not be intentionally assaulting (quite often they are), they carry with them the same abusive connotations that the majority of LGBTQ+ individuals in the Midwest endure. The overwhelming nature of Christian institutions and teachings causes heightened detrimental effects on the mental health of an already ostracized minority. This work interrogates and uncovers the aforementioned issues through written word, photographs, and localized maps.

Are you sure you want to post that?

Treasure Chimere-Obika

Abstract

Are you sure you want to upload that comment? Will that post cause harm or good? About 59% of U.S. teens have been bullied or harassed online, and a similar share says it is a major problem for people their age. In her poster presentation, Treasure Chimere-Obika will address what cyberbullying among youth is, why it happens, and why it is more common among young people. The presenter also hopes to discuss with her audience members how parents, schools, and social media companies can play an important role to prevent cyberbullying.

Let's Make a Bad Guy

Michael Inman

Abstract

To write a good story, a writer needs a detailed plot and setting, a good protagonist, and a memorable antagonist. An antagonist's role is to propel the story forward, usually by performing actions against the protagonist. This research explores popular archetypes of antagonists as villains from popular stories and provides useful tips on how to create a memorable villain.

The Feminist Landscape: Poetry to Reclaim the Female Body

Michelle Watts

Abstract

In a world where the female body has always been policed and politicized, poetry acts as a sanctuary that enables us to explore that liminal space in our own way, to explore what it means to be a woman living each day in America's current political hellscape. In other words, the war on gender and the female body rages on. In the Midwest and in the Bible Belt states in particular, this war is all the more conspicuous, all the more palpable.

This panel aims to use poetry as a means to fight back and to reclaim all of the power that has been taken from us without our permission, slowly but certainly, by a country that believes it is acceptable to view its women, its wives and mothers and grandmothers and sisters and aunts and daughters, as second-class citizens. By entering into this conversation of what it means to be a feminist in 2020, we also enter into a larger conversation, one that does not view "feminism" as a dirty word, but as a source of power. Our bodies, after all, belong to us, and us alo

The Unethical Overuse of Celebrity Focus in Non-Celebrity Focused Photojournalism

Levi Kinnamore

Abstract

When a photo surfaced of a young Senator Bernie Sanders of Vermont being arrested at the 1963 Chicagoland protests, an event in protest of school segregation in Chicago, political rivals and supporters of the Senator alike jumped on the opportunity to use it for their own means, either in support of him for his choice to fight for civil rights, or against him for similar reasons and/or for the act of being arrested. As a result, the image blew up to massive proportions on the focus of the Senator. This is problematic, as the original focus of the photo was to put the issues of civil rights up and forward. In a time when the issue of civil rights, albeit in separate functions than what was fought for then, is surging back up, creating focus on the wrong topic of a photograph or article not only devolves the original argument, but proves itself unethical in using the photo for something other than the original focus in the first place.

The prevalence of Secondary Language Acquisition in elementary, middle, secondary, and post-secondary schools.

Janelle Lawson

Abstract

The primary purpose for this research is to determine which level in the education process, secondary language acquisition occurs more frequently. My methodology in this research was a mixed method of quantitative and qualitative data. I researched scholarly literature. I distributed an Institutional Review Board approved survey and collected data from University of Central Oklahoma faculty, staff, and student body. The results of my UCO IRB approved survey exhibited that the prevalence was greater in high school for the participants who completed the survey. Through my literature review, I have discovered there is no definitive data available on the prevalence of secondary language acquisition in elementary, middle, secondary, and post-secondary schools. The data collected during my literature review shows a trend of decreasing enrollment in the United States at every level of education and is lacking sufficient research in the prevalence of secondary language acquisition in every level of education.

The Impact of Deliberate Practice on Spatial Mapping in American Sign Language/English Interpretation

Felicia Dunlap

Abstract

The purpose of this research was to investigate the effects of deliberate practice on spatial mapping in students' American Sign Language/English interpretation. For years, people believed that one's innate talents and the degree of individual practice correlate extraordinary performances and excellence. Some researchers believe that deliberate practice is responsible for improved performances. Deliberate practice includes goals, extended time, cognitive challenge, repetition, self-analysis, and feedback. This is the first research to use deliberate practice for the improvement of spatial mapping while applying physical and cognitive abilities. Our objectives were to improve interpreting competency, provide insight into the accuracy of self-perceptions, facilitate growth and accuracy in spatial mapping while aiding in the development of meta-cognitive abilities. For our method, students were asked pre-interpreting and post-interpreting interview questions on their interpretations of two separate videos. Out of two interpretations, results showed first, a 43% gain from the pre-assignment to the post-assignment in instances of spatial mapping mentioned. The second was a 73% gain from the pre-assignment to the post-assignment in instances of spatial mapping mentioned. Overall, we concluded that deliberate practice is an essential method for improving performance. Our study reveals that students improved their spatial mapping skills and met the objectives of our research.

Language Revitalization in the Digital Age

Briana Mason & Amy Lyons-Ketchum

Abstract

Approximately 600 languages have disappeared in the last century, and they continue to disappear at a rate of one language every two weeks. The purpose of my research is to revitalize indigenous languages by integrating modern forms of technology. By creating scan-able QR Codes linked to audio files, I was able to apply a unique method of language learning throughout East Central University's campus so our entire community had access to Chickasaw vocabulary through their cell phones. As a result, these codes have been scanned well over a 100 times spreading both the Chickasaw language and awareness about endangered languages. Confining language learning to classrooms prohibits applying language in everyday life. Language is everywhere, and learning methods should aid in expanding the domains where language is used. Having modern technological access to language learning will help improve the revitalization of all endangered languages.

Women's Equality: Are we still fighting for it?

Brandy Ball

Abstract

Women began fighting for equality in 1848 at the Seneca Falls Convention. Although women eventually won the right to vote, are we still fighting for equality 172 years later? Many women are still fighting to be taken seriously and refusing to let gender stand in the way to be heard, have opinions matter, and even fight for the same pay as men. There are many things that the world has advanced in yet it is in these areas that women are fighting everyday. It seems that the world is still trying to figure out that women are multi-taskers; we can be parents, maintain household, have careers, and still have ambitions that take us outside the home. Women are fully capable of doing everything that men do but somehow it is our genitals that exclude us from the same rights and privileges as men. We are women, and we never stop roaring for equality in all areas.

Proposed Title: Increasing Student Engagement through the Central Undergraduate Research Board

Michael Springer & Dana Jackson-Hardwick

Abstract

Participation in undergraduate research has many benefits for students and institutions, including deeper engagement in the discipline, enhanced cognitive and personal development, strengthening professional relationships between faculty and students, and improved graduation and retention rates (Bauer and Bennett 2003; Dean and Kaiser 2010; DeLoach et al. 2012; Kuh 2008; Lopatto 2010; Malachowski et al 2015; and Springer et al. 2018). Despite the known benefits, institutions can struggle to broaden participation in undergraduate research due to barriers including a limited undergraduate research culture, misunderstandings about what constitutes research, and student fears to reach out to faculty (Brew 2016; Gibbs, 2018; Malakowski 2017; Mathis et al. 2015; Morrison, 2017; Wayment and Dickson, 2008). In 2015, the University of Central Oklahoma created the Central Undergraduate Research Board, a student advisory board to address barriers to undergraduate research. The poster will examine some of the barriers identified and initiatives the students have created to increase participation in research opportunities. The poster will present both qualitative and quantitative data to measure the board's impact on broadening participation at Central Oklahoma.

Beijing's Shift to a Neoimperialist Approach in Tibet

Bailey Pope

Abstract

During the late 1980s, events concerning Tibet had caused the Chinese Communist Party (CCP) to reconsider its moderate approach on the autonomous region. This somewhat liberal strategy failed to persuade the majority of Tibetans to officially become part of China. To amend this, Beijing decided it would assume more inflexible and direct control over the situation in Tibet. This presentation seeks to address this change in policy as well as demonstrate the similarities it shares with aspects of neoimperialism. Additionally, the implications of such a high-risk approach will be discussed in conjunction to the future of Tibet.

How Great Powers Adapt: The instability and Policy of Superpower Demise

Justin Olmstead

Abstract

The 1956 Suez crisis marked the end of the British Empire and the rise of the United States as the preeminent world power. But the events in the Egyptian desert were not the beginning of Britain's downfall or America's rise. The previous two decades had seen the leaders of both nations make choices intended to lead to peace and stability in the world. The defeat of the Axis and the creation of the liberal world order was supposed to be led by a resurgent British Empire supported by its former colony. The expense of two world wars had weakened Britain to the point that the war-time control lasted into the mid-1950s. Conversely, the United States had grown rich off of those same wars and was ready to flex its financial muscle to bring American style democracy and capitalism to the world.

While numerous dramatic events occurred from 1945 to 1955, the focus here will be on where British and US leaders consulted each other; where they were willing to work together, and where, as with Formosa and summits with Soviet leadership, they diverged. It will question whether or not their friendship was strong enough to bring Britain and the United States towards a common goal even if doing so superseded national interests.

Pads for Prisoners

Makayla McGuire

Abstract

The state prison systems, especially in the state of Oklahoma, consist of a large number of incarcerated women. Due to the financial constraints and unsanitary living conditions women often endure many challenges. One of those challenges being inadequate menstrual products. Across the United States women are allotted 12 pads per month on average. Women are sometimes required to show their used feminine products to guards in order to obtain more, should that even be an option. As of 2017 Federal prisons were required to provide free menstrual products that would adequately meet the needs of incarcerated women. While this is progress it does not affect majority of the female population in prison, as most are in state or county jails. The goal of this project is to determine whether or not Oklahoma is providing adequately. A survey is administered to willing participants at local re-entry programs. This survey consists of a series of questions in regard to the number of products they received each month and whether or not this allotment met their needs. In the future, we hope to incorporate interviews and tours of various jails into the study. Ultimately the goal is to ensure that women have adequate products to meet their most basic needs while in jail. The living conditions are already unsanitary and living without essential products, or surviving with few, creates an environment for illness.

Pass the Peace Pipe of Understanding and Knowledge to Future Generations

Lauren Tahbonemah-Trayler

Abstract

Regardless of having an overall negative history, all types of student perspectives played an important role in the history of Indian boarding schools. Despite continued government efforts to forcibly assimilate Native Americans into white American culture, some students utilized their boarding school experiences to empower themselves and their culture. Whether these encounters were inherently negative or positive, some students chose to use their knowledge in ways that bettered themselves in white America, without losing site of their tribal connections. These experiences played an important role in the history of Indian boarding schools, which led to the fundamental change of these boarding schools into what they are today, institutions focused on supporting Native American education in a non-militaristic atmosphere.

A Bunch of Steel Nerve and Muscle: Bonnie Gray as a Rodeo Icon

Amanda Barnette

Abstract

Amanda Barnette, Graduate Student in History, and Patti Loughlin, Professor of History, University of Central Oklahoma

Verna Smith created a charismatic persona beginning in the early 1920s under the name Bonnie Gray. She contributed to the inclusion of women in rodeo during her tenure as a recognizable figure for the sport. She participated in contracted and contested events including performing daring stunts, trick riding, and relay racing. Additionally, she performed in Western film as a stunt double and actor and provided opinions as the unofficial representative for rodeo in response to the Humane Society's criticisms of the sport and the treatment of animals. Throughout her career as an accomplished rodeo star, Bonnie presented herself as a cowgirl athlete and created a place for herself in the sport while challenging traditional gender roles. Based in Burbank, California, she traveled to compete in shows including Cheyenne Frontier Days and the Pendleton Roundup. Utilizing the Bonnie Gray Papers housed at the Dickinson Research Center at the National Cowboy & Western Heritage Museum, the research addresses Gray's significance to the sport of rodeo in addition to determining the defiance of traditional gender roles for women during the early twentieth century. Bonnie pushed against social conventions by following her calling to be a rodeo athlete and performer. She lived a life in the spotlight and competed with steel nerve and muscle.

Investigating a Lost History and Fractured Collection: The Dutch Church, Austin Friars, Book Collection

Peter Kavourgias & Amena Butler

Abstract

During World War II, Lambeth Palace, home to the Archbishop of Canterbury and the Lambeth Palace Library in London, suffered significant damage during the German bombing raids, partially destroying its library that resulted in approximately a loss of a third of its collection. Following the war, a donation from the Dutch Church in London remained in the Lambeth Palace Library. Significant gaps exist in the historical records of both the Dutch Church and Lambeth Palace. By developing a historical record of the collection through the use of existing literature, archives, on-site examination of items, and interviews, an accurate account involving the circumstances surrounding the significant donation to Lambeth Palace can be created, along with discovering how books from the collection came to be located in other archives and institutions around London. This knowledge will assist with the interpretation, cataloging, and understanding of the collection and the history that surrounds it.

Contemporary Colonization: The Dutch Ankara Print Fabrics of the Kuba Kingdom

Amena Butler

Abstract

The history of Dutch Wax print fabrics associated with Central and West Africa is complex and unusual. These textiles sold globally by European and Asian companies in African markets does not make them authentically African. Rather, the commercialization demonstrates the contemporary form of colonization through the agency of global resources of countries outside of Africa. This examination utilizes research from the University of Central Oklahoma's African textile collection and communication with the curator of Dutch Language collections at The British Library, all of which helped identify Dutch sources, including European companies that market their African fabrics directly to Africa. This research broadens the study on contemporary colonization of African societies by providing provenance of African textile designs, authenticity of labels, and their country of origin. Textiles made by, manufactured and sold by African societies and the diaspora are considered authentically African and should be named as such.

Clara Luper, Dolores Huerta, and Wilma Mankiller: Gender and Civil Rights Activism in the North American West

Alexis Landeros & Patti Loughlin

Abstract

Being an American has no set look or gender. African American, Latina, and Native American women such as Clara Luper, Dolores Huerta, and Wilma Mankiller, respectively, have been leaders in the history of the United States. Clara Luper, a history teacher who worked with the NAACP Youth Council, organized sit ins in Oklahoma City beginning with Katz Drugstore in 1958. Dolores Huerta, co-founder of the United Farm Workers Association in the 1960s, organized agricultural workers and used tactics such as strikes and boycotts to achieve safer working conditions and better wages in the 1960s and 1970s. During the early 1980s, Wilma Mankiller, a citizen of Cherokee Nation in Oklahoma, coordinated the Bell Waterline Project to bring water to the town of Bell and then became the first woman Principal Chief of Cherokee Nation in 1985. These three women were activists who led civil, social and labor movements during the second half of the twentieth century. A diversity of women's experiences must be included in our history books to inspire the next generation of women of color to continue to make America theirs. Research for this project includes primary sources such as oral history interviews and archival research at the Western History Collections and a review of the secondary literature.

Confucius Institutes in Oklahoma

Kui Zhuo

Abstract

This article takes the relevant facts of the Confucius Institute at OU and the Confucius Classroom at UCO as the main survey and interview objects and refers to the public data related to the Chinese Ministry of Education, Hanban, and universities and governments in the United States. It has played a positive role in promoting the cultural, educational and academic exchanges between China and the United States and enhancing the friendship between students of the two countries. On the other hand, scholars have written that CI have been criticized for impeding academic freedom and for their corruption-prone internal funding practices. Of course, part of these negative news may be caused by the cultural and social system differences between China and the United States, which reflects the discomfort and conflict between Confucius institutes' educational concepts, traditional Chinese concepts and American values and educational principles.

This paper holds that the positive and negative influences generally represent different views and interpretations of the status quo of CI and keep neutral position to look forward to the future prospects of CI. In addition, it is hoped that the CI will become a driving factor for enhancing the friendship between China and the United States in the future, rather than the other way around.

Key Words the Confucius Institutes (CI) Sino-America Relationship conflict

Not the American Cause

Kara Montgomery

Abstract

In 1789, the French revolutionaries used the American Revolution as a model for their uprising. Bolstered by the alliance between their countries, the French hoped the Americans would be a source of help during this crisis. However, to the surprise of the French, the American people were not as supportive as expected. Americans hesitated to support the war because the disorderly violence in France caused the American people to further view the French Revolutionary War as extremely brutal and not worthy of their support. Most notably, the brutal murders of the French royals sent shockwaves through America. In a letter to her daughter, Abigail Adams described how most of America felt about France by saying, “I wish, most ardently, that every arm extended against that unhappy country might be withdrawn.” After seeing how unorganized the French people were during battles and how many lives they lost because of it, Americans decided to diplomatically separate themselves from France.

The Bolshevik Revolution: Defining Socialism Through the 20th Century

Dawson Holloway

Abstract

Only days after Petrograd fell to Lenin and his Bolshevik army, ‘Babushka’ Ekaterina Breshkov-Breshkovskaya, one of the leading socialist thinkers through the 19th century wrote: “Nothing in this world is so old as that which is now called ‘Bolshevism.’” After decades of commanding legions of populists that demanded personal justice and freedom in Russia, Babushka lived to see her country become the first major power to ever turn to a form of Socialism, and she detested it. Often in the study of history, both the capitalists who feared the Soviet Union and the communists who loved it interpret the Bolshevik Revolution as a victory of socialism over democracy. This view fails to explain why the people who most resented the Bolshevik victory were socialist. By evaluating what the leading socialist thinkers were writing during the Russian Revolution, and the following Civil War, it becomes clear that the conflict was about more than two clashing ideologies. The significance of the Bolshevik Revolution lies in Bolshevism’s victory over all other branches of socialism, defining socialism through the 20th century.

"Worshipping at the Cesspool and Flesh Pots of Iniquity:" The Criminalization of Homosexuality in the United States

Zane Baird

Abstract

In 1950s America, homosexuals were considered unsuitable, infected, and corrupt. While other minorities, like African Americans, were already challenging existing laws of discrimination through protests and lawsuits, homosexuals were only beginning to embark on their legal crusade for equality. The government defined homosexuality as a criminal act, considering them to be perverts, immoral, “sick”, and indecent, which was consistent scientific conclusions. As a result, homosexuals lived in the shadows of society. It was the criminalization of homosexuality that drove homosexuals in the United States to fight for their right to legally exist. After years of discrimination and criminalization of homosexuality in the United States, homosexuals, culminating in the Stonewall Riots, declared they no longer accepted being second-class citizens.

"They fought for our language, they fought for our freedom": Native American Code Talkers and the Struggle for Cultural Reclamation

Ruth Anne Dunn

Abstract

Native American Code Talkers have, in recent decades, finally received recognition for their war efforts. These primarily Navajo men created and transmitted an unbreakable code that was key to winning World War II, which was possible due to the linguistic differences between Navajo and Japanese. Their contribution to the War in the Pacific marked a significant shift in US-Native American relations. The need for the code broke down barriers to learning tribal languages and helped end Dawes-Era policies of cultural destruction. Ultimately, the Navajo Code Talkers' legacy allowed them and countless other Native Americans to break free of societal pressure to assimilate and to publicly take pride in their heritage. One of the most important outcomes of this cultural restoration was reviving native languages that almost went extinct. This poster highlights the Navajo Code Talker's impact on the end of American policies of cultural destruction, specifically focusing on linguistic aspects on the Navajo Code and the revival of native languages following World War II.

How Harlem Set the Model for Broadway: The Significance of 1921s ‘Shuffle Along’

Cora Clegg

Abstract

Miller, Lyles, Sissle, and Blake’s 1921 ‘Shuffle Along’ was the first integrated, successful book musical performed on Broadway. The definition of a book musical is: characters, dialogue, form, placement of song and dance, tone, and theatrical values put at the service of an overarching story or concept. Musical theatre is a highly collaborative singular art form that blends dramatic literature, verse, music, design, voice, mime, and dance. It is the musical book that holds this all together bringing all parts into a seamless form and brings all the artists involved into a single creative production. “Shuffle Along’ meets all of these criteria. Using the critical theory of the culture industry by sociologists, Theodor Adorno and Max Horkheimer, it proves that this stage production is particularly suited to take cultural mechanisms and incorporate them into a reproducible authentically American model. Furthermore were it not for racial tensions of the post-World War I era Jim Crow public sphere, this all-Black production and not Jerome Kern’s ‘Showboat’ (1927) would be credited with saving the Broadway theatre scene. ‘Shuffle Along’ was the catalyst and appropriated model that led to the successful transformation of American Musical Theatre into a serious and authentically American art form that was born from and features stories of racial and social tensions.

An Exploration of United States' Policy Decisions During the South Asia Crisis

Aaron Cornell

Abstract

From 1969 to 1971, the Indian subcontinent was enthralled by a tumultuous series of events known as the South Asia Crisis. The South Asia Crisis culminated with the states of India and Pakistan engaged in their third war since the 1947 Partition. During the South Asia Crisis, East Pakistan (now Bangladesh) suffered over a million casualties. This crisis played out at the height of the Cold War as tensions ran high between the superpower states of the United States, Soviet Union, and China. These superpowers were engaged with proxy conflicts and internal turmoil, which distracted them from the developing situation in South Asia. During the South Asia Crisis, the United States supported the presidency of Pakistani General Yahya Khan, while the Soviet Union supported the Indian government under Prime Minister Indira Gandhi.

Research examining the motivations and overarching effects of United States involvement during the crisis is scarce. This paper works to fill that gap, which is particularly important to the study of American foreign policy. The actions taken by the United States during the South Asia Crisis were the result of internal disagreement, misunderstanding and distraction stemming from the implementation of the détente policy with China. American policy decisions during the crisis allowed the Soviet Union to become a larger influence on the Indian Subcontinent.

Heathen Inheritance and Taming Femininity: The Role of Gender and Christianity in Colonial Mentality and the Imagery of Anglo-Algonquin Encounters

Tanner Luther

Abstract

Recent scholarship has begun critically examining the roles gender and religion played in the Virginia Colony, its formation, and how they affected the people who resided in or near it. Joining this trend, I examine in my research how English gender roles and religious ideals affected early English depictions of and interactions with Virginia Algonquins. In reading secondary sources, I became interested in the works of Kathleen M. Brown Rebeca Anne Goetz, and how their arguments could be practically applied to depictions of Virginia Algonquins in 17th century European art and imagery. I argue it is impossible to fully ascertain English colonization and interactions with the Virginia Algonquins in the 17th century without a understanding of English conceptualizations of gender and religion. Algonquin women in colonial Virginia challenged patriarchal hegemony. Using the life of Pocahontas (Matoaka) as a case study, I demonstrate how Algonquin women utilized extant social and religious institutions in both English and Algonquin cultures to define their own roles in colonial society. Among the primary sources consulted in this study were the works of English observers, such as those of Captain John Smith and Henry Spelman's Relation of Virginia, along with the contemporary engravings of Johann Theodor de Bry and Theodor Galle, which I argue depict the indigenous peoples of the Americas as what Rebecca Anne Goetz termed "hereditary heathens."

One Person - One Vote: Addressing Gerrymandering in Oklahoma Through Policy and Mathematics

Thomas Milligan, Ph.D., Liz Lane-Harvard, Ph.D., &
Raegan Mach

Abstract

The purpose of this project is to mathematically analyze the current Oklahoma House and Senate districts, as well as create new models for these districts based on population, communities of interest, and party affiliation. My research will be directed towards understanding what is fair regarding legal issues and current policy on the matter. Beyond this, our group of researchers plan to utilize this background information and data collected through surveys and focus groups to formalize which issues affect perceptions of fairness to better understand which should be implemented into the mathematical model to be created.

The Past, Present, and Future of the European Union and Brexit

Colby Karcher

Abstract

In recent political climates, isolationism has taken a prominent place. An example of this isolationist trend is Brexit. This paper will not only cover Brexit itself, but also the effects we may observe as a result of Brexit. This poster will use metrics such as polling data, economic forecasts, and sociological predictions. Further, this poster will also look at the European Union and propose solutions to enable the European Union to last the Brexit referendum. Overall, this poster will seek to further the understanding of Brexit, its impacts on the international stage, as well as in the European region.

The Rise of the Women's Movement in Oklahoma

Cheryl Van Den Handel

Abstract

This paper investigates the incentive structures underlying the rise of the women's movement in Oklahoma. The women's movement has been slow to emerge in Oklahoma, exemplified early on, and for many decades, by singular women rising to prominence in leadership roles, making slow progress in women's rights and representation against "traditionalists" in the legislature and local governments. Oklahoma has existed as a deeply Republican state after the election of 1948 (with the exception of the 1964 landslide election of Lyndon Johnson), where a majority of the population adheres to traditional roles and family structures and upholds a conservative ideology.

While many other Oklahoma women have made significant political contributions, we contend that a movement per se has only appeared in the state since 2016. In the 2016 election women stood for offices across Oklahoma in unprecedented numbers and participated in the Women's Marches and Teacher's Marches. It's important to understand how and why the uptick in women's political participation has contributed to the rise of a women's movement in the state.

The leaders of various women's organizations in the state have been interviewed and an open-ended survey has been sent to the memberships of these organizations to determine their incentive structures guiding their participation (currently in process). Responses will be coded and analyzed.

“AMERICAN WOMEN”

Dan Brown

Abstract

'AMERICAN WOMEN" WILL REVIEW THE EVOLUTION OF WOMEN'S RIGHTS IN THE AMERICAN POLITICAL SYSTEM.WOMEN RECEIVED THE RIGHT TO VOTE WITH THE APPROVAL OF THE 19TH AMENDMENT IN 1920.DURING THE LAST 100 YEARS, WOMEN HAVE BEEN ELECTED TO PUBLIC OFFICES THROUGHOUT THE UNITED STATES, INCLUDING THE POSITIONS OF GOVERNOR,UNITED STATES HOUSE OF REPRESENTATIVES AND THE UNITED STATES SENATE. MOST RECENTLY, WOMEN HAVE GAINED POSITIONS IN THE STATE AND FEDERAL JUDICIARY INCLUDING THE UNITED STATES SUPREME COURT. THE SOLE REMAINING QUESTION IN THIS ANALYSIS IS WHEN THE CITIZENS WILL ELECT A WOMAN TO BE PRESIDENT OF THE UNITED STATES.

Assessing International Studies Identity Through Artificial Intelligence Strategies, Ethics, and Practices

Ryan Kiggins

Abstract

The nation-state with the best national artificial intelligence strategy, will dominate global politics in the near future. This claim rests on the shift in military affairs to AI directed semi-autonomous and autonomous weapon system development concomitant with the innovation and implementation of value creation propositions that utilize the surveillance economy on which AI economics is based. Nearly forty nation states have announced national artificial intelligence strategies for the purpose of ensuring military and economic relevancy during the fourth industrial revolution. This panel, scrutinizes national AI strategies for the purpose of assessing how international studies scholars must adjust and adapt scholarly identities, ideas, and institutional practices necessary for conducting research in the global AI society.

The Effects of Race and Socioeconomics on Voting in the 2000 and 2008 Presidential Elections

Sarah Scott

Abstract

This paper takes the demographics of race and socioeconomics in modern times from the southern and western regions of the United States. Race and socioeconomics have been an issue that has impacted presidential elections since its implementation. This is designed to show how the demographics of these regions impacted the state's presidential vote. I hypothesize that both race and socioeconomics held relatively equal weight in the outcome of how the states in these regions voted in these two elections. I plan to use data from the GSS and NES to show how these two demographics impacted voters within the states on an individual level. Which in turn effected the electoral vote to a given presidential candidate. I conclude that my potential findings could hold some validity and how these findings might have and could affect future non-incumbent presidential elections.

U.S. Military Force: Necessary or Negligent?

Pierce Warn

Abstract

This poster will go over how the U.S. military has shown the use of force both domestically and internationally. It will use examples of domestic conflicts such as, but not limited to, Kent State. Furthermore, examples of international conflicts such as North Korea and Iran will be utilized. Examination of the moral decline due to these engagements will be discussed. In conclusion, this presentation will seek to justify the necessities of these military actions.

StingRay: Security or Invasion of Privacy?

Jesus Manzano

Abstract

This poster goes over the ramifications of the controversial cellular phone surveillance device StingRay on local-state-federal collaborations and its undermining of the principles of federalism and separation of powers. Furthermore, it will cover how Stingray utilization exposes lack of accountability and transparency among our police agencies and raises serious questions about the security of individual rights.

Influencing Factors on an Individual's Attitudes Towards Abortion

Maci Fox

Abstract

Research has shown that there are many factors that contribute to abortion attitudes. This paper is going to study the factors that influence individual's attitudes towards abortion. Using data from the GSS I test the hypothesis that three factors are positively correlated with attitudes on abortion; the individual's scientific knowledge, their education level, and income. I then conclude the paper by discussing the implications of findings along with outlining some places where further research into this topic can go.

What Motivates Swing Voters?

Brandon Ramirez

Abstract

The term “swing voter” has become a media and political buzzword in recent years with candidates at nearly all levels of elections vying for their support. The importance of these crucial voters cannot and should not be understated. President Donald Trump broke the Democrats’ vaunted “Blue Wall” in 2016, pulling swing voters away from the coalition built by President Obama in 2008 and 2012. This tide turned in many respects in 2018 when millions came to the polls, setting turnout records, in mid-term elections handing control of the House of Representatives back to Democrats while also electing record numbers of women to Congress. My research will explore the motivations of swing voters. I will begin by defining the term itself. Swing voters should not be viewed as a monolithic group as most lean to one party but are typically described as still persuadable. I will look into what issues make swing voters support one candidate over another, including vote switching or electing not to vote at all. President Donald Trump, unlike previous Republican presidents, made the topic of immigration the centerpiece of his campaign. Despite the public’s generally favorable view of immigration, concerns over illegal immigration and security have caused a schism in opinion to form not only between the major parties, but within the parties themselves. My hypothesis is that immigration is the primary issue motivating swing voters today. I will test

Oklahoma is not "O.K.": The Rise of Opioids in the Sooner State

Kaitlyn Brown

Abstract

In recent years, Oklahoma has experienced a rise in prescription opioid deaths that have left many families grief stricken and begging for answers. Through this research I hope to uncover why opioid use has increased in Oklahomans, how Oklahomans are dealing with the loss of a loved one, and if there is a way that Oklahoma can be "O.K." again. To gather research about this topic I will be looking at drug awareness programs and their accessibility to the public, the Johnson & Johnson opioid court case, and how Oklahoma as a state is moving to decrease opioid deaths.

Factors that influence a successful re-election of an incumbent President.

Bruno Aveiro

Abstract

Conventional wisdom states that an incumbent president will be re-elected as long as the economy is good. This paper will examine the factors that influence whether an incumbent Presidents will be re-elected. To answer this question I plan on studying presidents who were not successful in obtaining a second term: George Bush Sr., Jimmy Carter, Gerald Ford, William Taft, and Herbert Hoover. I investigate the factors that led to their inability to get re-elected. The paper will start its analysis with how the economy was performing during their term in office. I also examine Congress's job approval rating from the public during the President's term, taking note if the President and Congress are aligned politically. If the president and Congress are divided, I will compare approval ratings for each. The paper will also examine the President's job approval rating. Another factor is campaign strategy used by the presidents. What have the one term presidents done different in their campaign that led them to lose? The remaining factor left is the social issues that might have influenced voting choices in their election. What was society facing during these president's time in office that potentially led voters to reject the incumbent president a second term? Was there a war that did not sit well with the American people that got the President kicked out of the white house? My paper will give more insight into the factors that influence a presidential electio

Oklahoma Prisons and Jails" Why Oklahoma is The Incarceration Capital of The United States

Nikolas Craig

Abstract

What makes Oklahoma so special? Why is Oklahoma ranked first in the nation in the number of people serving time behind bars? Is it due to lower socio-economic levels, easy accessibility to three major Interstate highways which intersect here, or, is it the "for profit" prison systems currently in operation within our great state? Investigating and understanding how these three factors work together to create this problem might better educate us on how to solve it.

Judicial Ruling Patterns: An Analysis of the Consistency of Judicial Rulings on Abortion Cases

Rylee McKee

Abstract

This paper will specifically be looking at the ruling patterns of justices on abortion cases and will be exploring whether or not there is variation in their approach to such cases at different court levels. While much work has been done to evaluate Supreme Court decision-making and the effects of public opinion on judicial behavior, little research has been done to compare the ruling behavior of justices prior to their appointment to the Supreme Court, versus their pattern of decision-making once confirmed to the highest court in the land. I hypothesize that, the higher up a judge moves in the judicial system, the more consistent their decision making in abortion cases becomes. I will also examine what factors contribute to the increase or decrease in ruling consistency; such as public attention/opinion on cases, the higher up one moves in the judicial system. Looking at Supreme Court justices who were appointed post-Roe v. Wade (1973), I will evaluate their decision-making in abortion cases in the context of their legal and personal backgrounds, as well as the saliency of the cases they ruled on, to see if those factors influenced their ruling. I will discuss the implications of my findings along with highlighting some areas for future research.

Hungry Tigers: Food Insecurity at East Central University

Christine Pappas

Abstract

During the spring of 2019, students in Political Science Research Methods conducted a survey of ECU students about food insecurity. This study was approved by East Central University's Institutional Review Board. Surveys were deployed in PS 1113 US Government classes as well as online through Survey Monkey. A total of 117 surveys were collected. Found that 49 out of 117 or 42% said that they had skipped a meal because they could not afford food while a student at ECU. They worry about money and they believe this worry affects their mental health. ECU students do not believe that their academic performance has been affected by their financial situation. As a result of this need, ECU has now created a food bank for students and employees through the Food Bank of Oklahoma.

History of Tribal Compacts and How they affect Oklahoma

Shelby Yates

Abstract

In 1870 the Supreme Court ruled on The Cherokee Tobacco case and decided that congress can replace treaties when conducting relations with Native Americans. In 1871 the United States stopped creating treaties with Tribes. States looked to compacts as a way to make agreements with the Native Americans. This is a special type of relationship, there is no other Government in the world that has a relationship similar to this. The State of Oklahoma has many compacts in place that concern issues such as tobacco sales, gaming, and license plates. This poster analyzes the history of compacts in Oklahoma and evaluates the recent conflict over the gaming compact.

Protecting Oklahoma's future by preserving our history through state parks

Derek Odom

Abstract

The importance of Oklahoma state parks can't be elaborated enough. Whether you live in a rural or urban area, you can always learn something new at a state park. We can learn about our native trees and grasses, native animals, and how they interact with one another to continue to flourish. We get a break from the stress of everyday life when we can go camping, fishing, and hiking, or just take a quick drive around the park. It is up to every one of us to help keep up the preservation of our state parks. From the beauty of the naturally formed Alabaster Caverns to Lake Murray (built by the Civilian Conservation Corps), we have and should always work to preserve the beauty of our state. This research also evaluates the feasibility of charging additional fees to visit states parks.

Analyzing the Factors and Policy Decisions Associated with Increased Forced Displacement from the Northern Triangle

Samantha Cowan & Aaron Cornell

Abstract

Since 2011, there has been a significant increase in forcibly displaced peoples entering the United States from the Northern Triangle of Central America (Honduras, El Salvador and Guatemala). These displaced migrants have been leaving their home countries due to gang violence, economic instability, and drought. This has led to a humanitarian crisis at the United States southern border as the number of asylum seekers and those arrested crossing the border has exponentially increased. The situation has only been exacerbated by misdirected policy decisions and fallacious rhetoric.

Our presentation will explain the major factors behind this crisis, while presenting policy recommendations aimed at alleviating it. We will also address any myths about the crisis as presented by news media and the current administration.

The Effects of the Electoral College on Representation and Voter Turnout in Oklahoma

Ruth Herman

Abstract

This research will investigate the relationship between states' adoption of the winner-take-all mechanism for allocating Electoral College votes on political representation and voter turnout. It is hypothesized that voters in non-battleground states believe their vote makes no impact in the course of the election due to the winner-take-all mechanism, leading to a decrease in political participation. This hypothesis will be tested by gathering quantitative and qualitative data on voter turnout as well as comparing results of states with different Electoral College voting schemes such as Maine and Nebraska. This research will be applied to the State of Oklahoma and will explore the possibilities of reform to increase Oklahoma voter turnout in presidential elections.

Tribalism In Our Society

Nierouz Alrashdan

Abstract

Project Summary- Tribalism is a moral bias in which one lacks self-awareness and views their group as superior to others. This bias is often overlooked in modern society. It is a bias that has caused tension in politics, individuality (or the self-concept), cultural belonging, and family relatedness. This research is aimed to identify the prevalence and frequency of tribal thoughts and the impact those thoughts have on elements of learning such as mindfulness, performance, and openness. The combined survey and reflective writing assignment will offer insight as to what is occurring on a college campus and how tribalism negative impacts the atmosphere of learning.

Goals of the project - The purpose of this project is to gain a better understanding of tribalism and its impact on college students. It may also shed light on the ongoing conflict of tribal bias in today's society and classrooms. It would be hoped that this study might offer some insight on what campuses could implement in order to reduce the risk of tribal thinking.

Methods - This research will start of as a series of survey questions that will be sent as an email blast to all of the University of Central Oklahoma's students and posted on social media. The survey will consist of completing Freiburg's Mindfulness Inventory as a pre and post questionnaire along with a version of the Eurobarometer Survey interrupted with 15 pictures reflection.

More Inclusive Medical Practices and the Overall Patient Experience

Joshua Mitchell-Arbital

Abstract

Medical care is something everyone will at some point need in their life, whether serious or not. From major surgeries all the way down to a regular dentist appointment or a six-month checkup with a primary care physician. My research partner and I have done research for the past year on more inclusive medical practices, more inclusive medical school curriculum, and how it can ultimately change people's lives. This is something that is necessary and needed to better understand and provide everyone with better and more inclusive care.

By More Inclusive Medical Practices, we mean that the doctors take the time to understand what the patient may be going through and be able to treat them better based upon gender, race, sexual orientation, and many other different factors that may play a role in someone's health.

Review of State Question 780

Elizabeth Maier

Abstract

What, if any, impact has SQ 780 had on the Oklahoma Criminal Justice system? Preliminary results will be shared. This research reviewed and analyzed the amount of arrests for certain offenses (i.e. possession of controlled-dangerous substances (CDS), Driving Under the Influence (DUI), and five property crimes) in Oklahoma from 2014 through 2019. The ultimate goal is to collect data through 2020 and include courts and corrections as well.

Adolescent Behavior on a College Campus

Kelly Crow & M. Nicole Warehime

Abstract

Gang membership and affiliation is not a highly spoken about topic among a general population, much less on a college campus. Due to this, a survey was created for the student population on a college campus to understand what social groups are attending the college as well as why. Some questions were directly correlated to gang affiliation and the results were unexpected. Of the 346 participants, over a fifth said they knew someone in a gang or were affiliated with one. Not only that, but more females admitted to being involved in a gang than males. If more college campuses provided their students with this survey, one may start to see patterns all over the nation that shows people the highest populations of gang activity in specific areas. Not only this, but it could provide information as to why these gang members and affiliates are attending college and what societal factors may have pushed them towards a higher education. With more in depth questions, gang members started sharing some of their life decisions and providing answers many may have never thought about.

College Students and Agents of Socialization

Austin Cardenas

Abstract

This research will study students who attend a southern university in Oklahoma. Sociological research indicates the correlation between lower socioeconomic status and educational disadvantages. This research suggests possible relationships among abuse, neglect and lower socioeconomic conditions. Oklahoma Promise is a scholarship program assisting families send their kids to college. This program requirements include families earning \$55,000 or less, students must apply during eight, ninth or tenth grade, maintain 2.5 G.P.A, and attend a school in the state

Prevalence of Intimate Partner Violence in the Heterosexual Community Vs. the LGBTQ+ Community

Mary Sargeant

Abstract

This research compares intimate partner violence in both communities to identify the gaps in reporting along with the perceptions in intimate partner violence between the two communities. So far, I have found that there are significant differences between the two and will further investigate the causes and if those differences are relevant in why individuals choose not to report violence committed against themselves. I conducted an IRB approved 33-question survey that was distributed via an email blast to the University of Central Oklahoma.

That there will be a significant difference between the two communities in why and how they report intimate partner violence along with what the two communities perceive intimate partner violence as.

Racial Disparities in Corrections

Lauren Buzbee

Abstract

This poster will examine the racial disparities in the criminal justice system. Race will be the key factor when analyzing differences in sentencing and incarceration. Components such as ethnicity, age, and gender will also be included. Policy implications to help diminish the disparity in corrections will be considered.

Why Volunteer in Nicaragua? Does the Experience Change My World in the U.S.?

Rachel Millea

Abstract

This research project is a summative evaluation looking at the impact of participation of volunteers in trips to Nicaragua through JustHope, Inc. (Tulsa, OK). Volunteers partnered with communities in Nicaragua on varying projects such as housing, cultural community events, medical/dental services, tree farming, etc. and represented persons from an array of job/career positions across the U.S., many of which were involved in JustHope trips through their church.

Trips with JustHope provide a positive impact to a greater or lesser degree throughout five select domain areas; economic, political, social/cultural, spiritual/religious, and self-awareness/growth. A 30-item Likert scale questionnaire and a 14-question interview questionnaire were used in Spring/Fall 2019 to gather data from a potential pool of 644 prior participants in Nicaragua trips. Seventy-five (75) surveys were completed and 21 interviews conducted. Demographic information from each participant was also acquired. The quantitative data was used to assess impact and compare variances between groups. Qualitative data was used to identify and discuss trends, patterns, and/or themes of impact to volunteers. No one select domain area was significant over another. The top five impact items represented each of the five domain areas. The survey items under the Profession/Work domain all fell within the bottom five level, indicating little to no impact of trips on work or professions.

Perceptions of Intimate Partner Violence

Samantha Brady

Abstract

Intimate partner violence is a widespread social problem in the United States, affecting millions of people. The physical and psychological damage caused by IPV can last for decades or, in some cases, for a lifetime. Previous research has shown that men who are victims of IPV do not seek any form of assistance. One reason for this is the misconception that men cannot be victims of abuse. The stigma of reporting IPV causes many male victims to stay in abusive relationships or becoming abusers themselves. This study, Perceptions of Intimate Partner Violence, aims to examine the perspective on male victims of IPV. In order to study this topic, we created a survey for University of Central Oklahoma students, faculty, and staff in an attempt to learn their opinion about male victims of IPV. We believe that having participants take this survey about IPV would not only help spread awareness but also help further research about this specific form of abuse.

Intimate Partner Domestic Violence

Yesenia Casas

Abstract

This poster will attempt to explain different types of intimate partner domestic violence and its effect on their partners, children and family unit as a whole. It will touch on the different stigmas associated with domestic violence and the proven long-lasting effects.

Effects of Hair Sheep Breed and Region of Origin on the Feed Dry Matter Requirement for Maintenance Without and With a Marked Feed Restriction

Arthur Goetsch & Ryszard Puchala

Abstract

The main objective was to determine if amounts of feed required for maintenance without and with a substantial restriction differ among hair sheep breeds and region of origin. Dorper (D; 46), Katahdin (K; 47), and St. Croix (S; 41) ewes were obtained from 45 farms in Midwest, Northwest, Southeast, and central Texas regions of the USA. The amount of feed offered was varied in the first 4 wk for stable body weight (BW), and average dry matter (DM) intake in wk 3-4 relative to BW^{0.75} was considered DM required for maintenance without restriction (DM_{m-m}). Feed offered in wk 6-10 was 55% of DM_{m-m}, with DM intake relative to BW^{0.75} in wk 9-10 considered the requirement with feed restriction (DM_{m-r}). Region had little effect on any measure. The DM_{m-m} was slightly greater for S than for D and K (49.4, 48.9, and 50.9 g/kg BW^{0.75} for D, K, and S, respectively; SEM=0.48). The decline in BW during the restriction phase was relatively small and similar among breeds (wk 9-10 vs. 3-4: 3.6, 3.2, and 2.9 kg for D, K, and S, respectively; SEM=0.21). The DM_{m-r} averaged 43% less than DM_{m-m}, again being greater for S than for D and K (28.3, 27.9, and 29.1 g/kg BW^{0.75} for D, K, and S, respectively; SEM=0.28). In conclusion, the amount of feed required for BW maintenance was greatest for S regardless of feed restriction, but differences were minor. The hair sheep exhibited considerable capacity for decreasing the feed requirement for maintenance when offered feed was markedly restricted.

Assessing Wellbeing in Dairy Goats

Terry Gipson, Luana Ribeiro, & Roger Merkel

Abstract

Behavior is a key indicator of animal welfare and wellbeing. The objective of this study was to examine the effect of management system (confinement (C) or grazing (G)) on the behaviors of rumination time (RT) and lying/standing (L/S) in dairy goats. Forty Alpine goats (57.7 ± 5.7 kg) in late lactation were randomly assigned to one of four groups. A replicated switchback design was used with Groups A and C the Confinement-Grazing-Confinement (CGC) and Groups B and D the Grazing-Confinement-Grazing (GCG) sequence. Each group spent 1 wk in each management system. A 40% forage diet was offered free-choice in both systems, with some growing forage available for goats in G as well. Goats were fitted with two tri-axial accelerometers, one in an elastic, nose-band halter and the other attached to the hind leg. Data were analyzed using mixed methods procedures under SAS software. Rumination time and L/S were not affected ($P > 0.10$) by sequence or replicate. Goats in G had greater ($P < 0.01$) RT than those in C (12.7 vs 10.2 min/h). Regardless of management system, goats had lower RT in the second week than in the first or third week of the experiment (12.2, 10.2, and 11.9 min/h in wk 1, 2, and 3, respectively). Daily L/S behavior was not affected ($P > 0.10$) by management. Lying time was 726 min/d in C and 699 min/d in G. Standing time was 714 min/d in C and 741 min/d in G. These results indicate that management system affects rumination time but not lying/standing behavior in dairy goats

Growth on Pasture and in Confinement of Young Kiko Bucks

Margaret Garcia-Gill, Terry Gipson, & Jessica Quijada

Abstract

Growth rate of young meat goats is a key factor in the profitability of the enterprise. Langston University (LU) in partnership with the American Kiko Goat Association conducted a Second Generation Buck Performance Test in 2019. The performance test measured average daily gain (ADG) in two phases, 6 weeks on pasture followed by 9 weeks in confinement. Seventy-seven Kiko bucks less than one-year of age completed both pasture and confinement phases. The pasture phase was conducted on a 57-acre pasture with native grasses and forbs in Logan county. Bucks were supplemented at 0.5% body weight (BW 25.8 ± 0.18 kg) daily to facilitate visual inspection of animals. The confinement phase was conducted at LU's testing facility with automated feeders utilizing a total-mixed ration fed free-choice. Bucks were weighed every 2 weeks on pasture and every week in confinement. ADG was calculated by linear regression using R. On pasture, ADG ranged from -48 g/d to 194 with an average of 91 g/d and a median of 98 g/d. In confinement, ADG ranged from -13 g/d to 230 g/d with an average of 113 g/d and a median of 114 g/d. Five bucks on pasture had a negative ADG compared to 2 bucks in confinement. The Spearman rank correlation between ADG-pasture and ADG-confinement was -0.15 ($P>0.17$) indicating that ADG on pasture was not a good predictor of ADG in confinement and vice versa. Future buck performance tests should incorporate pasture and confinement phases to more precisely identify

Relationships Among Body Condition Score, Linear Measures, Body Mass Index, and Growth Performance of Yearling Alpine Doelings

Arthur Goetsch, Terry Gipson, & Ryszard Puchala

Abstract

Alpine doelings (54; initial body weight [BW] and age of 32 kg and 306 days, respectively) were used in a 12-week study to evaluate relationships among body condition score (BCS), body mass indices (BMI), and growth performance with 75% forage diets. Linear measures were height at the withers (Wither), length from the point of the shoulder to hook bone (Hook) and pin bone (Pin), and circumference from heart girth (Heart). BMI included BMI1 (BW/Wither), BMI2 (BW/Hook), BMI3 (BW/Pin), BMI4 (BW/Heart), BMI6 (BW/(Wither x Hook)), BMI7 (BW/(Wither x Pin)), BMI8 (BW/(Heart x Hook)), and BMI9 (BW/(Heart x Pin)), all in g/cm². Correlation coefficients of BCS were 0.39, 0.21, and 0.32 for BW, average daily gain (ADG), and dry matter intake (DMI) in g/day, respectively, with nonsignificant r for residual feed intake and ADG:DMI. The r were 0.71, 0.58, 0.66, 0.69, 0.78, 0.67, and 0.812 between BMI1, BMI3, BMI4, BMI6, BMI7, BMI8, and BMI9 and BW; 0.36, 0.45, 0.42, 0.34, and 0.42 for BMI2, BMI3, BMI6, BMI7, BMI8, and BMI9 and ADG; and 0.49, 0.56, 0.47, 0.63, and 0.58 for BMI1, BMI3, BMI6, BMI7, and BMI9 and DMI in g/d, respectively. BMI were not related to residual feed intake, and there were some BMI with weak relationships to ADG:DMI. In conclusion, relationships between measures of performance and BMI were stronger than those for BCS and, thus, BMI should receive future attention to objectively assess body condition.

Persistence of *Mycobacterium avium* subspecies paratuberculosis in composted fecal matter of Spanish goats

Roger Merkel & Jessica Quijada

Abstract

Johne's Disease (JD), caused by *Mycobacterium avium* subspecies paratuberculosis (MAP), is a contagious, chronic, and fatal disease of ruminants. In Oklahoma, incidences of JD must be reported to the State Veterinarian's Office. MAP is also associated with Crohn's Disease (CD) in humans; however, there is no reported link between JD and CD. MAP is difficult to eradicate; it reportedly can survive pasteurization and is tolerant of heat. The American Institute for Goat Research (AIGR) tests its goats and sheep for JD and culls test positive animals. One carcass disposal method used by AIGR is composting. The present study assesses MAP persistence and viability under composting conditions. Three JD positive Spanish does, as indicated by ELISA and fecal PCR, were held for 3 days in elevated 4' x 4' pens for fecal collection. Fecal samples, 5 to 6 g, were sealed in Ankom™ filter bags (F57), 9 bags/doe. Does were euthanized according to AIGR standard procedures and composted using barn sweepings and chopped wheat straw. Filter bags were placed near the carcass and at three other locations in the pile. Internal pile temperatures reached 130, 132, and 144°F for the three carcasses. After 75 days, the piles were opened and filter bags retrieved for PCR analysis. Results for all samples were positive indicating the MAP is detectable by PCR after 75 days of mortality composting reaching temperatures of 130 to 144°F. Samples are undergoing bac

Pregnancy Rate and Embryo Viability for Timed Laparoscope-aided Insemination in Response to Chorionic Gonadotropins Given in the Early Transitional Breeding Season and GnRH 5 Days Post Insemination

Rommel Calle

Abstract

The objective of this study concerned the influence of gonadotropin given 24 h prior (E; n=26) or 24 h after (L; n=40) removal of intra-vaginal progestagen (P4) used for 12±1 d on pregnancy rate (PR) and embryo viability (EV) of mixed parity lactating and non-lactating Alpine goats bred during the early transitional breeding phase. A control (C) group (n=38) did not receive gonadotropins. PR was evaluated at 18 to 24 d (non-return to estrus; NRE), 30 d (pregnancy specific protein B; PSPB), and at 40 d (ultrasound imaging; UI). Goats were time-bred at 48 h after P4 insert removal by laparoscopy (LAI; n=75) using frozen-thawed semen (400 x 10⁶ sperm/mL and having >45% motility) or by natural service (NS; n=29). GnRH analogue was given (n=51) 5 d after insemination, and the remaining goats (n=53) received a placebo. Overall PR at 18 to 24, 30, and 40 d post breeding (dpb) for LAI and NS was 77 and 72 (P>0.60), 68 and 66 (P>0.80) and 69 and 69% (P>0.97), respectively. A logistic model was used to determine the absence of effect of E/OS protocol (P>0.81), 5d GnRH (P>0.37), and their interaction (P>0.66). In summary, gonadotropins given before or after P4 removal for PR of C, E, and L were 76, 73, and 76 at NRE (P>0.91), 66, 65, and 70 at PSPB (P>0.89), and 66, 69, and 73 at UI (P>0.81), respectively. EV to 30 and 40 d was 90% and was not influenced by E/OS (P>0.42), 5 d GnRH (P>0.18), or their interaction (P>0.23). Lactation influenced EV at 30 (P<0.03) but not at 40 dpb (

Influence of GnRH Given 5 Days After Intrauterine Insemination or Natural Service on Embryo Viability and Progesterone Levels on day 16 and 30 of Goats Estrus Synchronized With GnRH or eCG/hCG

Fabiola Encinas Aspiazu

Abstract

Objectives of this study were to determine the influence of GnRH given 5d after breeding on embryo mortality (EM) and of progesterone levels on day 16 and 30 of goats estrus synchronized with gonadotropins. A total of 54 lactating and non-lactating Alpine goats (3.1 yr old ± 2 SD) of mixed parity were synchronized and fixed-time bred 48h after progestagen (P4) removal using laparoscopic-aided (LAI) insemination or natural service (NS) during the early transitional breeding phase using 11 or 12 or 13 days with 300 mg of intravaginal (P4), 2 mL of PGF2 α given at P4 removal. In addition, 120 IU eCG/60 IU hCG (n=40), or a GnRH (n=14) was used 24h after P4 removal. Relatedly, to decrease EM, 25 goats received 1 mL of GnRH 5d post-breeding (dpb); the remaining 29 received 1 mL placebo. GnRH at 5 dpb GnRH influenced (P=0.06) EM, both at 30d (0 vs 50%) and at 40d (20 vs 50%), compared with goats receiving placebo. Although PR, evaluated at 30d and at 40, was 65 \pm 0.35%, the levels of P4 (ng/mL; average \pm SE) were equivalent (P>0.12) for pregnant and non-pregnant goats at 5d (5.9 \pm 0.73 and 6.0 \pm 0.84), 16d (11.2 \pm 0.95 and 11.7 \pm 1.3), and 30d (56.2 \pm 0.74 and 8.3 \pm 1.0), respectively. We conclude that gonadotropin source given 24h post P4 removal leads to similar PR using LAI or NS. Related variables of parity, lactation, and days of P4 exposure (11, 12 or 13) did not influence EM or PR. However, GnRH if used 24h after P4 exposure, and also given a

Follicular Dynamics and Estrus Response of Alpine Goats Estrus/Ovulation Synchronized During the Early Transitional Reproductive Phase Using eCG/hCG Given Early or Late

Erick Loetz

Abstract

This study aimed to quantify the size of peri-ovulatory (PO) follicles and the influence of eCG/hCG (PG600®) on estrus and ovulation. A total of 122 PO sites from 14 non-lactating Alpine goats ranging from 1 to 6 kiddings, averaging \pm SD 3.9 \pm 2.0 years of age, 56.3 \pm 5.0 kg of body weight (BW), and 2.6 \pm 0.2 body condition score (BCS), were evaluated in the early transitional reproductive phase. Goats were randomly assigned to one of three E/OS protocols exposed to 12 d of 200 mg intravaginal progestagen (P4). The traditional (T; n=4) did not receive gonadotropins whereas the early (E; n=5) was given PG600 24 h prior to P4 removal. Both T and E received prostaglandin (PGF2 α) concurrent with P4 removal. The reverse (R; n=5) received PGF2 α 24 h prior to P4 withdrawal as well as PG600 concurrent with P4 withdrawal. Ovaries were scanned trans-rectally by ultrasound imaging during 4 consecutive d starting with the first i.m. injection of 1.0 mL PGF2 α or 1.5 mL PG600. Using a logistic model, variables age, BW, BCS, and parity did not have influence ($P>0.05$). Standing estrus response to each E/OS (T, E, or L) up to 24 h after P4 removal, ascertained using teaser bucks, was 50, 80, and 80% ($P>0.05$), respectively. Likewise, ovulation was 100, 80, and 100%; and the average \pm SE number of ovulations/goat was 2 \pm 0.41, 1 \pm 0.32, and 1.3 \pm 0.49 ($P>0.05$). The location of the Graafian follicle was similar between left and right ovaries (P

Influence of Age, Parity, Breeding Procedure, Ostium Cervix Type, and Vaginal Secretion on Depth and Time of Cervix Transversion in Boer Goats

Joshua Farris & Erick Loetz

Abstract

Pregnancy success resulting from artificial insemination (AI) is directly related to depth of semen deposition in the female's reproductive tract and inversely related with stress caused by the procedure. Hence, the objective of this experiment was to determine if breeding procedure, age, parity, ostium cervix type, and vaginal secretion influence the depth and time of cervix transversion. This study evaluated 10 nulliparous (N), 17 primiparous (P), and 31 multiparous (M) Boer goats with average \pm SD age, BW, and BCS (mode) of 2.1 ± 0.98 , 40.6 ± 9.3 , 2.75; 3.4 ± 1.3 , 49.9 ± 10.8 , 2.5; 5.5 ± 1.4 , 58.2 ± 8.0 , 2.5, respectively. Goats were synchronized for 14 d with 200 mg of intravaginal progestagen (P4) and 1 and 2 mL of i.m. PGF2 α on day 0 and day 14, respectively. Goats in estrus were colored marked by teaser bucks showing that 95% percent expressed standing estrus. Two technicians inseminated by transcervical AI or by catheter 46 to 50 h after P4 removal. Ostium cervix type was classified as Rose or Other and vaginal volume secretion (VVS) was determined with an arbitrary scale. A LSM general linear model was used to determine statistical significance. None of the variables influenced the time of cervix transversion ($P > 0.13$) or AI catheter passage depth through the cervix when measured in cm ($P > 0.07$) or by the number of cervical rings crossed ($P > 0.14$). Goats in estrus had increased VVS, which a reduced model for depth in cm, showed th

Burning for Redcedar (*Juniperus virginiana*) Control in Oklahoma

Raquel Lourencon & Terry Gipson

Abstract

The objective of this study was to measure the degree of control of redcedar provided by burning in Oklahoma. There were three research locations in Oklahoma, Langston, Mannford, and Midwest City (0.81 ha). The redcedar population was inventoried, quantified as to height, width, and GPS coordinates. The surrounding area was cleared by clipping cedars and the dry cedars (fuel) were stacked on the border of sites to be burned. A fire plan was made and burns were conducted in the three locations. Percentage green canopy was scored 3 months after burning. Percentage green canopy of the trees according to size (short; $\leq 1.83\text{m}$ or tall; $> 1.83\text{m}$) and presence of fuel were analyzed using Chi-Square statistics. Burning was more effective in Langston with 33% of green canopy remaining ($P < .001$), while Mannford and Midwest City averaged 64%. In all locations the presence of fuel around the trees potentiated the fire and reduced green canopy to 28% as compared with the trees not surrounded by fuel with 79% of green canopy ($P < 0.001$). In Midwest City, taller trees were better controlled by fire and averaged 60% of green canopy, while the shorter trees averaged 69% ($P = 0.021$) with no significant differences due to height of tree in Langston and Mannford or when data of all three locations were analyzed together. The presence of fuel around the trees can potentiate the fire and give a better control of redcedar. However, burning was not a very effective method to control redcedar.

Evaluating the potential of using a 5-gallon pail to compost kitchen meat scraps

Jaliyah Flowers & Roger Merkel

Abstract

Kitchen vegetable scraps are commonly composted but not meat trimmings due to potential for odors. This trial compared composting raw (R) and cooked (C, boiled in 3-cm water) beef scraps to a control treatment of no scraps (N) in 20-l plastic pails. Six pails, 2 per treatment, had 1.3 cm holes drilled around the circumference in a 5 by 8 cm triangular pattern to allow air exchange for aerobic decomposition. A composting medium of ground alfalfa hay and wheat straw (AW, 50:50 by weight) was hand mixed with water to roughly 50% moisture content. As R and C pails were filled with AW, approximately 250 g R or C was placed in the center at both the 1/3 and 2/3 fill level. N pails were filled with AW only. Detectable odor by sniff test and temperature (T, 5 locations, 5 and 20 cm horizontal depth at 1/3 and 2/3 fill levels and at 20 cm vertical depth in the pail's center) were recorded thrice weekly for 7 wk after which decomposition of meat scraps was rated on a 5-point scale, 1 - none to 5 - total. No offensive odor was detected at any time. Peak T, 30 to 55°C across all pail locations, occurred in wk 1 and declined to 20 to 21°C across locations by the trial's end. All decomposition scores were 4 except one R location that recorded a 3, indicating moderate to good decomposition. Over time, AW in all pails dried, became moldy, and attracted flies. Periodically mixing pail contents and adding water may have helped maintain T for decomposition and prevented m

The use of Pregnancy Specific Protein B at 32 Days to Establish Embryo Number in Alpine, Spanish, Boer, Tennessee Stiff-Leg, and Angora Goats of different parity

Alexia Thurmond, Joshua Farris, & Erick Loetz

Abstract

Embryo number detected early in pregnancy allows for management actions to decrease prenatal wastage. Hence, this study used placenta specific serological protein B (PSPB) levels to determine its association with embryo number as determined by transabdominal ultrasound imaging (UI). Goat breeds used were dairy (Alpine; n=156), meat (Spanish, Boer, and Tennessee Stiff-Leg; n=165, 75, 54, respectively) and mohair-producing (Angora n=14). A total of 179 nulliparous, 119 primiparous, and 166 multiparous goats were evaluated. Overall, Alpine, Spanish, Boer, Tennessee Stiff-Leg, and Angora goats had an average \pm SD age in years, body weight in kg (BW), and the mode of body condition score (BCS) of 2.8 ± 9.2 , 47.6 ± 9.2 , 2.0; 3.3 ± 2.0 , 36.8 ± 9.6 ; 4.3 ± 2.0 , 52.8 ± 11.4 , 2.5; 3.7 ± 2.2 , 32.9 ± 8.8 , 2.5; 7.4 ± 1.3 , 40.7 ± 11.3 , 2.5, respectively. Blood samples were collected by jugular venipuncture at 32 days post first breeding (dpfb) from goats that were estrus and ovulation synchronized and bred by artificial insemination or natural service. To determine PSPB levels serum samples were processed by a commercial lab using BioPRYN®; an ELISA-based assay. An ordinal logistic classification model was used to determine statistical significance. Both, PSPB ($P < 0.001$) and breed ($P < 0.005$) influenced the prediction of embryo number (i.e., 0, 1, and 2 or 3) detected clinically by UI at 42 dpfb. Although a tendency was found for BW and parity

Birds Preferring High Protein Worms with Low Fat Versus Worms with Low Protein and High Fat.

Ashton Marlar

Abstract

Wild birds in Bartlesville and Tulsa, Oklahoma due to their dietary needs which may change due to the drop in temperature from summer to winter might require higher protein foods. The most common types of birds in the area of the feeders are Robins, Doves, Finches, and sparrows. Protein is necessary for construction of enzymes, tissues, and needed for reproduction, mating, and the growing process. The reproduction, mating, and growing process requires more nitrogen than what the simple maintenance of the body holds and proteins are the source of this nitrogen. By setting out two different feeders each containing worms with high and low protein as well as different fat levels. It was observed that birds preferred the lower protein wax worms with higher fat over the higher protein superworms with lower fat.

Effect of Combination of Branched-Chain and Limiting Amino Acids on Growth Performance and Feed Intake Regulation in Nursery Pigs Fed with Low Protein Diets

Cedrick Shili, Julia Sutton, & Mohammad Habibi

Abstract

The aim of this study was to assess the effect of combination of dietary branched-chain amino acids (BCAA; i.e. leucine, isoleucine and valine) and other limiting amino acids (LAA; i.e. lysine, methionine, threonine and tryptophan) at levels greater than suggested requirements on growth performance and feed intake parameters of pigs fed with low protein diets.

Forty-eight weaned barrows were individually assigned to: 1) positive control: 20% crude protein (CP); 2) negative control (NC): 14% CP; 3) NC with LAA 25% > suggested levels (L25); 4) NC with LAA 50% > suggested levels (L50); 5) NC with LAA and BCAA 25% > suggested levels (LB25); 6) NC with LAA and BCAA 50% > suggested levels (LB50). At week 4, blood and tissue samples were collected after euthanasia and data were analyzed with univariate GLM.

LB50 group had higher final body weight than L50. Average daily feed intake was greater in LB50 and LB25 than L50 and L25, respectively. Plasma serotonin level was reduced by LB50 relative to L50 and NC. The mRNA abundance of hypothalamic TPH1 and 5HTR2B was affected by diet, but no differences were detected among groups. The mRNA abundance of hypothalamic NPY was higher in LB50 and LB25 than NC.

The growth performance and intake of pigs fed with LP diets supplemented with both BCAA and LAA was improved partly through hypothalamic NPY.

Effect of a Corn-Expressed Phytase on Growth Performance, Blood Metabolites and Fecal Microbiota of Nursery Pigs Fed Diets with Reduced Calcium, Phosphorous, and Protein

Cedrick Shili

Abstract

Moderately low protein (LP) diets with reduced calcium (Ca) and phosphorus (P) may decrease the nutrients excretion from the swine production, but these diets reduce the growth performance of pigs. The objective of this study was to investigate the effect of a corn-expressed phytase (CEP) on growth performance, serum metabolites and fecal microbiota in nursery pigs.

Forty-eight weaned barrows were allotted to six treatments: A) standard protein (24%), B) LP (13%), C) LP+2000 FTU/kg CEP, D) LP+4000 FTU/kg CEP, E) LP & low Ca and P+2000 FTU/kg CEP and F) LP & low Ca and P+4000 FTU/kg CEP. At week 4, blood and fecal samples were collected for metabolites analysis and microbial amplicon sequencing, respectively.

Pigs fed with C and F had higher average daily gain than those fed with B. No differences among groups were detected for serum Ca, P and alkaline phosphatase. Serum osteocalcin was lower for group F than group B. The feces of pigs in group C was enriched in family Lachnospiraceae, while group D had higher abundance of genus *Succinivibrio* and group E had higher populations of genus *Bifidobacterium* and phylum Actinobacteria.

In conclusion, supplementation of moderately LP diets with a CEP decreased the negative effects of these diets on growth performance and produced differential effects on fecal bacterial population.

The association of BMD, TBS, and bone fracture in osteoporosis patients among different ethnicities

Danrich Kruger & Ning Wu

Abstract

Osteoporosis brings more clinical significance over the world. Bone Mineral Density (BMD), a measurement of bone calcium level and density, has been the standard diagnostic method in Caucasian Americans (CA). However, it is not well fit for African Americans (AA), and Mexican American (MA). Trabecular Bone Score (TBS), a measurement of bone texture, has been integrated into osteoporosis diagnosis recently. This study retrospectively analyzed the association of BMD, TBS, and history of fractures among the populations of CA, AA, and MA by using NHANES 2005-2008 data. All patients were above 50 years old. The data of BMD and TBS were categorized upon the ethnics along with the history of previous fractures. The results showed that, in women, the BMD showed no significant change with the fractures among the three ethnicities, while an increased fracture rate was seen with worsening TBS category. In men, there was an increase in the prevalence of fracture with worsening TBS and BMD in all ethnicities. Both genders had an association between TBS/BMD category and previous fractures, which were much higher for CA than AA and MA. In conclusion, the association of fractures and TBS/BMD varied by race and gender. It would be more beneficial to evaluate the potential of fracture in osteoporosis patient by combining both TBS and BMD together. More research is needed for ethnicities and populations around the world to determine the weight of BMD and TBS in osteoporosis diagnosis.

Analysis of suicide incidence between Native American and United States total population

Tayler Hedgecock, Caitlin Cosby, & Ning Wu

Abstract

The suicide rates in Native American population have been known to be higher than that of US total population. This study focusses on exploring the different suicide rates between American Indian (AI) and US total population among age groups and gender. Numbers of suicide and total population were retrieved from CDC and US Census Bureau databases from 2006 to 2015. The percent of suicides contributed by AI to the US total suicide was 1.13-1.31%. The rate of suicide per 100,000 individuals in the population showed that the highest suicide rates occurred in the 20-24 age group for AI and 25-34 age group for US total population. The top three age groups for suicide rate were (1) 15-19, (2) 20-24, and (3) 25-34 with (2) > (1) or (3) in AI and (3) > (2) > (1) in US total population. Cross comparison of suicide rates amongst the gender groups showed that the highest rates for AI males were ages 20-24 followed by 25-34, while it was 45-54 followed by 55-64 for US total male population. The AI female population showed the highest suicide rates in the 15-19 and 20-24 age groups compared to 45-54 followed by 55-64 in the US total female population. Among all AI age groups, the male suicide rates were significantly higher than that of the females, except for the 10-14 age group where they were statistically similar to the top three age groups of 15-19, 20-24, and 25-34. In summary, the AI suicide rates substantially exceeded that of the US total population for age groups 44 and below.

The pathophysiological pathway of osteoporosis to provide early diagnose and treatment of osteoporosis for postmenopausal women

Ning Wu & Brittany Perez Vega

Abstract

The treatment of osteoporosis is continuing to expand by the production of new drugs and new methods of testing for osteoporosis. The research that has been conducted brings new insight for a more efficient treatment and accelerated diagnosis to patients, particularly postmenopausal women with osteoporosis, which have or show signs of osteoporosis. By determining the pathophysiological pathway of osteoporosis, the most suitable treatment for the patient may be determined to maintain the balance of bone resorption and new bone mineralization. To accelerate the process of diagnosing osteoporosis, it is crucial to understand the data collected in the testing done on the patient. The tests that are discussed in diagnosing osteoporosis are blood diagnostic test, the measurement of bone loss with the use of bone resorption markers, the measurement of bone formation by the use of bone formation markers. To provide better insight in treatment of osteoporosis the mechanism of the drugs used to treat patients with osteoporosis is discussed; in which the findings from the test used for diagnoses leads to the determinate drug for treatment that best suits the patient.

Algorithmic approach to incubation of Escherichia coli DH5 α : Derivation of E. coli alpha formula

Darrin Wade, Ning Wu, & Stacie Oliver

Abstract

The goal of this study is to derive an original formula for expediting the lab used E. Coli growth rate. The DH5 α strain with an expected optical density (OD600) range of 0.15-0.20 was applied. This desired OD range is critical for the following preparation of electrocompetent cells in the lab. The formula was derived from the standard equation that converts an OD600 to the amount of cells/mL. This formula will allow researchers to reach desired OD600 in 1-2 hours through 3-5 cell cycles. Several trials were conducted to confirm the fidelity of the formula. The formula includes a few steps, so it really is more of an algorithmic process. The variables in the formula take various unknowns into account: Concentration of stock bacteria, variable generation time, and number of bacteria to grow. This research is an initial step for further research in electroporation to create electrocompetent cells. The algorithmic steps include finding initial concentration of stock bacteria, adding a specific number of cells to 20 mL of LB media, and incubating at 37°C, 280 rpm for 1.5-2 hours. The E. coli alpha formula is as follows: (1) $[\text{Start OD600}] \times 5.0 \times 10^8 = [\text{Sample (cells/mL)}]$; (2) $1/[\text{Sample (cells/mL)}] \times 8.0 \times 10^7 = [\text{Volume of bacteria (mL) adding to 20 mL of LB}]$. The result of this study can be used in small-scale, low-budget labs for them to prepare electrocompetent cells for their electroporation application.

Photoinducible Changes in Cell Morphology and Phenol Content Related to UVB Tolerance in Isolates of Zygnema (Streptophyceae)

Steven O'Neal

Abstract

Zygnema is a freshwater alga that forms thick mats that float at the water surface. Cells located at the surface of mats are exposed to very high visible light and UVB compared to cells deep within the mats. Previous studies have shown that Zygnema grown at high visible light and UVA levels shows increased tolerance to UVB exposure that coincided with an increase in UVB absorbance suggesting the photo-induced production of UVB protective compounds. We investigated whether visible light or UVA exposure induces changes in UVB absorbance and whether increased production of phenolic compounds is responsible for the absorbance changes. We exposed two Zygnema isolates to different light treatments: high light with UVA, high light without UVA, low light with UVA, and low light without UVA. After 7 days of exposure, cells were photographed and cell lengths measured. Weighed samples were extracted in methanol. The extracts were scanned with a UV spectrophotometer to determine UVB absorbance and quantitatively tested for total phenolic compounds. Zygnema isolates exposed to high light exhibited a 296% increase in UVB absorbance which coincided with a 255% increase in total phenolic content compared to samples exposed to low light. Removing UVA at high visible light exposure resulted in decreased phenolic content for only one isolate. Cell length decreased 51% in high light treatments. Removing UVA resulted in significantly larger cells only at low visible light.

Characterizing Bacteria of The Extremophilic Melting Pot Habitats of the McMurdo Dry Valleys

Teresa Mccarrell

Abstract

Life exists in nearly every niche on Earth, and Antarctica does not present an exception. Extremophilic bacterial communities are found in Antarctic habitats such as the permanently cold and hypersaline environments within and below permafrost and in subglacial water bodies. The ability of psychrotolerant (“cold-tolerant”) and halophilic (“salt-loving”) bacteria to survive and replicate in Antarctica has astrobiological implications, because similar conditions of extreme cold and hypersalinity are expected in places such as on Jupiter’s moon Europa, or around and below the ice caps on Mars. For this study, samples were collected from various locales in the McMurdo Dry Valleys of Antarctica, including around Blood Falls, the moraine of the Taylor Glacier, and within the proglacial Lake Bonny. Experiments were conducted on nine isolates in order to characterize how psychrophilic and halophilic they were, by growing them on media of various salinities and at various temperatures. Nucleic acids were extracted from them to compare their phylogenetic relationships based on sequence identity of the 16S rRNA gene. Some have distinct phenotypes when grown on agar plates, such as bright pink pigment and or mucoidy colonies. These traits may help these organisms survive under conditions of strong UV radiation or limited nutrients. The unique adaptations of these bacteria that enable their survival in these environments could be similar to those exhibited by

Prevalence and Abundance of Gastrointestinal Parasites in Kiko kids goats from 16 States of the USA

Terry Gipson, Ryszard Puchala, Margaret Garcia-Gill, & Jessica Quijada

Abstract

Gastrointestinal parasitism is a multi-etiological infection being a major constraint in small ruminant production. The younger animals are especially susceptible as their immune system is not competent to cope with these infections. To determine the prevalence, composition and abundance of gastrointestinal parasites in Kiko goats, a total of 170 male kids (aged 4-6 month-old) were evaluated. Origin farms (n= 27) were located in 16 states of the USA. Individual fecal egg counts (Mc Master method) and pooled coprocultures (by state) were performed to identify the Strongylida genus. The higher prevalent were the strongyles nematodes 89.6% and protozoa Coccidia (*Eimeria* spp) 78.9%. Other observed helminths were Strongyloides papillosus 38.2%, tapeworms (*Moniezia* spp) 16.7%, Nematodirus spp 2.8% and whipworms (*Trichuris* spp) 1.4%. The fecal egg counts (FEC) for main parasites strongyle and coccidia were high (mean values: 2349.1 \pm 4553.3 EPG, 4460.3 \pm 9136.9 OPG, respectively) and showed an overdispersed distribution (coefficient $k < 8$) with few animals harboring the highest burdens. Infected animals with the high parasite burden for strongyles (EPG>1000) and coccidian (OPG>3000) accounted for 45.6% and 38.5%, respectively. From coprocultures identified species were *Trichostrongylus* spp, *Teladorsagia* spp, *Oesophagostomum* spp, *Haemonchus contortus*, *Bunostomum* spp and *Chabertia* sp. These epidemiological facts might be considered when control programs are planned.

Chronic Pesticide Exposure Alters Motility and Circadian Rhythms in Late Season Honey Bees (*Apis mellifera* L.)

Sahar Delkash-Roudsari & Ana Chicas-Mosier

Abstract

Honey bee pollination services, products, and management represent multi-billion dollar industries in the United States and Europe. These valuable pollinators are also experiencing population decline likely attributed to habitat fragmentation, pesticide application, and pathogens. Studies have shown negative impacts on behavior and survival following exposure to various pesticides however prior research has struggled with chronic exposure metrics. The Trikinetics Activity Monitor system allows individual honey bee tracking over the course of their entire captive lifespan. The present study uses this system to look at two-week aqueous exposure of glyphosate (herbicide active ingredient), RoundUp® (herbicide formula), imidacloprid (neonicotinoid insecticide), and ethion (organophosphate insecticide) and the impacts on minute-by-minute motility, daily circadian cycling, and survival. Imidacloprid negatively impacted all three metrics in exposed honey bees. Ethion showed little impacts on motility but reduced circadian rhythm adherence with no survival effects. Both herbicides showed dose-dependent results with RoundUp® effects being more severe than its active ingredient, glyphosate. The results of this study demonstrate the value of activity monitoring for insect species of economic or ecosystem concern. These data also demonstrate that chronic exposure to various pesticides may impact bees even at sub-lethal exposure concentrations.

Sublethal Imidacloprid Exposure Reduces Movement but not Learning in Late Season Honey Bees

Sarah Simons & Ana Chicas-Mosier

Abstract

Insecticides work through multiple mechanisms of action to target some insect species over others, however where we focus our work is where non-target organisms can be affected. Imidacloprid is the most widely used insecticide in the world and this study will investigate how it affects honey bees. Honey bees contribute nearly \$20 billion to the value of U.S. crop production. This economic contribution comes from a production of crops for growers and American consumers. Neonicotinoid residues, such as imidacloprid, can occur in nectar and pollen which bees collect and take back to the hive, ultimately exposing all of the bees within the hive. Imidacloprid affects the neurotransmitters in honey bees, reducing their ability to move or think. We hypothesized that exposure to imidacloprid would negatively affect the honey bee's behavior when locating food and orienting. We used conditioning on honey bees exposed to a sublethal dose of imidacloprid (0.2mg/L) in 1M sucrose as compared to controls. Bees were placed in a Y-maze and recorded for the number of seconds spent in each arm of the maze as the bee moved through the apparatus. Our data showed that bees given a sublethal dose of imidacloprid exhibited paralysis. Therefore, showing just how dangerous imidacloprid could be to the honeybee population. A healthy beekeeping industry is important to a healthy U.S. agriculture economy.

Loss of Angiopoietin 4 protects from renal fibrosis in mouse model of ureteral obstruction

Myshal Morris

Abstract

Nearly 45% of all deaths in the developed world are attributed to some type of chronic fibroproliferative disease along with chronic kidney diseases (CKD) affecting over 10% of the worldwide population. Kidney fibrosis is the final common pathway of progressive kidney diseases, which results in subsequent significant destruction of the normal kidney structure and its function. Fibrosis of the kidney is caused by prolonged injury and dysregulation of the normal wound healing process in association with an excessive deposition of extracellular matrix. However, the exact mechanisms of CKD remain unclear due to the complexity of various contributing factors. Thus, the Angiopoietin 4 like protein (ANGPTL4) is being examined as a possible treatment solution as an effort to repair kidney fibrosis. ANGPTL4 is a protein that is used as a serum hormone for regulating lipid metabolism and previous research has shown it to contribute to wound healing in diabetic mice. So, in our study through using the Unilateral Ureteral Obstruction mouse model, (UUO) we want to systematically assess the implications of kidney fibrosis interacting with ANGPTL4. After performing UUO we identified the effects of ANGPTL4 KO comparatively with wild type ANGPTL4 through western blot and qPCR analysis. Our results conclude with ANGPTL4 wild type having much lower fibrosis than that of the ANGPTL4 KO which may help improve future understandings of the mechanisms of kidney fibrosis.

Effects of imidacloprid, ethion and glyphosate on associative learning in honey bees (*Apis mellifera* L.) using Electric Shock Avoidance

Ana Chicas-Mosier & Sahar Delkash-Roudsari

Abstract

Honey bees (*Apis mellifera*) play an important role in agriculture worldwide. These organisms are in decline, especially in the U.S and Europe and this has been attributed to several factors including agrochemicals. A growing human population and subsequent need for more crop production have led to widespread use of agrochemicals and there is growing concern that pollinators are being affected by these pesticides. The present study compares sub-lethal and lethal dosages of imidacloprid, ethion, and glyphosate on aversive learning in honey bee foragers. In a controlled laboratory environment, we observed honey bee choice following aversive and neutral stimuli paired with color (a blue/yellow shuttle box design) following acute oral treatment of imidacloprid, ethion and glyphosate at two concentrations each. We found that imidacloprid and ethion have negative impacts on aversive learning following a single-dose of pesticide. It was also observed that honey bees have a yellow bias, an unexpected result for the subspecies and region of the study. Overall, the results suggest that short-term exposure to concentrations of imidacloprid and ethion adversely affect honey bees foragers.

Comparison of suicide death rate between Native American and United States total population

Ning Wu, Caitlin Cosby, & Tayler Hedgecock

Abstract

The suicide rates in Native American population have been known to be higher than that of US total population. This study focuses on exploring the different suicide rates over the total death between American Indian (AI) and US total population among age groups and gender. Numbers of suicide and total death were retrieved from CDC and US Census Bureau databases from 2006 to 2015. The percent of suicides contributed by AI to the US total suicide was 169-193%. The rate of suicide per total death showed that the highest suicide rates occurred in the 15-19 age group for AI and US total population. The top three age groups for suicide rate were (1) 15-19, (2) 20-24, and (3) 10-14 with (1) > (2) = (3) in AI and (1) > (2) > (3) in US total population. Cross comparison of suicide rates amongst the gender groups showed that the highest rates for AI males were ages 15-19 followed by 20-24, and the same is shown for the US total male population. The AI female population showed the highest suicide rates in the 10-14 age group followed by the 15-19 age group compared to the 15-19 followed by 20-24 age group in the US total female population. Among all AI age groups, the male suicide rates were significantly higher than that of the females. In summary, the AI suicide rates substantially exceeded that of the US total population for age groups 24 and below.

Anti-carcinogenic Effects of Dandelion's Extract on HeLa Cells

Mel Vaughan, Chandler Newton, Giulia St. Peter, & Christina Hendrickson

Abstract

Some plant-derived products have pharmaceutical uses for anti-carcinogenic properties. Some of them like dandelion (*Taraxacum officinale*) are well-tolerated and safe for consumption. Dandelion is well-known among Middle Eastern and Chinese people for its anti-inflammatory and anti-carcinogenic effects and is consumed as tea and salad. It is unclear what is the mechanism of effect on cancer cells themselves though. This study investigated the anti-carcinogenic effects of dandelion on HeLa cells. The hypothesis is that the anti-cancer activity of dandelion extract acts by disrupting key cellular processes in tumor cells, which could result in growth inhibition and apoptosis. Dandelion Whole Extract (DWE) was prepared, filtered, lyophilized and resuspended in growth media. HeLa cells and normal human dermal cells (HDF, as control) were maintained under standard conditions then treated with different concentrations of DWE from 8 to 0 mg/ml for 96 hours. Cells were assessed for proliferation, apoptosis, and cell migration. Our results showed that DWE at the dose of 4 mg/ml and lower inhibited proliferation while promoting apoptosis in HeLa cells, but not HDF cells. Cell migration assay showed significant inhibition of HeLa cell migration while HDF cells were not affected and were able to fill in the wound scratch gap in 48 hours. This study supports the possible use of dandelion as a natural source of anti-carcinogenic compounds against cervical cancer.

CHO Cells vs Insecticides and Herbicides: A 120-hour Fight to the Death

Meghan Garner, Bela Hadley, Todd Mangile, Dusti Sloan, Cassandra Ortiz, Huxley Rainwater, & Michelle Xiong

Abstract

Over the last few decades, the use of pesticides, which include herbicides and insecticides, has skyrocketed. With this increase, there is growing concern that wildlife and humans could be adversely affected by residual chemicals. The goal of this study was to determine the cytotoxicity of commonly used crop chemicals on Chinese hamster ovary (CHO) cells. CHO cells were seeded in 96-well plates at 1×10^4 cells/mL and allowed to adhere. Roundup (glyphosate), Sevin (carbaryl), and Bayer Advanced Garden (neonicotinoid) were diluted in growth media to concentrations of 10%, 5%, 2.5%, 1.25%, and 0.63%. CHO cells were exposed to these chemicals for 120 hours. An MTT viability assay was used to determine whether the chemicals were toxic to CHO cells. Cells incubated in all concentrations of Roundup (herbicide) and Bayer (insecticide) were significantly less viable than control. Cells incubated in Sevin (insecticide) concentrations greater than 2.5% were significantly less viable than control. These results indicate that chemicals commonly used on crops could be detrimental to wildlife and humans. Given the dramatic increase in the use of pesticides, it is important to continue in-depth studies of chemicals used to treat crops.

Viability Assay and Potential Effects of E-juice on Rat Lung Cells

Kadin Falkensten, Dusti Sloan, & Timothy Brawdy

Abstract

The 2015 National Youth Tobacco Survey, conducted by the Centers for Disease Control, estimated that over 7 million adolescents have tried e-cigarettes. With limited data about the health effects of e-cigarette use, also known as “vaping,” the goal of this study was to determine the cytotoxicity of commonly used vape components on rat lung epithelial (RLE) cells. RLE cells were seeded and dilutions of vape base, nicotine, cannabidiol (CBD) oil, and a diacetyl-containing flavoring, “Space Jam” were added to RLE cells and incubated for five days. An MTT viability assay was used to determine whether these vape components were toxic to RLE cells. In general, vape base was not toxic to cells, except at the most concentrated 5% dilution. Cells incubated in 5% and 2.5% nicotine were significantly less viable than control. Cells exposed to 1.25% nicotine were not different from control, while cells incubated in 0.625% nicotine were significantly more viable than control. All dilutions (2.5%, 1.25%, and 0.625%) of CBD oil were toxic to cells. The more concentrated “space jam” flavoring treatments (2.5% and 1.25%) were toxic, while the 0.625% treatment was not different than control. These results provide greater insight into the potential harmful effects of vape components used in e-cigarettes. Given the dramatic increase in the use of e-cigarettes, it is important to continue in-depth studies on the toxicity of vape components.

MeCP2 Plays Crucial Role in the Hypermethylation of the GLS Gene in the TNBS Treated Animals

Christy Eslinger

Abstract

Approximately 3 million Americans suffer from some form of inflammatory bowel disease (IBD), chronic inflammation resulting in hypersensitivity and loss of mucosal layers in colon. We have documented an increase in the expression of glutaminase (GLS) gene in the 2,4,6-trinitrobenzenephonic acid (TNBS)-induced colitis in rats. We found there is a CpG island in the promoter region of the GLS gene, which overlaps with the coding region. This led us to believe that DNA methylation may be playing a crucial role in the modulation of the GLS gene expression. TNBS-induced colitis increased methylation of the CpG island resulting in increased GLS gene expression. Treatment with Azacitidine (Aza), a demethylating drug, resulted in a significant decrease in the hypermethylation. Methyl-CpG binding protein 2 (MeCP2) proteins are known to be interacting with methylated CpG dinucleotides. Utilizing a modified ChIP assay followed by a bisulfide conversion and a methylation specific PCR (MSP), we confirmed that MeCP2 directly interacts with the methylated CpG dinucleotides in the promoter region of GLS gene. These results suggest that demethylating agent, Aza, Can be potentially used for reducing inflammation and alleviating pain in IBD patients.

KIX Domains as a Targeted Motif For HTLV-1 TAX AD Mediated Proviral Activation

Justin Harris

Abstract

Human T-cell leukemia virus type-1 (HTLV-1) is a retrovirus which can cause Adult T-cell Leukemia/Lymphoma (ATL). Activation of the provirus is controlled through a minimal viral promoter with transcriptional enhancer elements recognized by host proteins and the virally expressed oncoprotein, Tax. This Tax stabilized activator complex then goes on to strongly recruit the coactivator protein (CBP/p300) to form a large complex. It is known mutations in the activation domain of Tax (Tax-AD) causes loss of transcription ability but still can fully recruit the activator/coactivator. CBP/p300 contains a KIX domain known to interact with Tax. Previous papers ruled out this Tax activation domain (AD) interaction with KIX, but preliminary results implicate the TaxAD-KIX interaction was masked from discovery. This project looks deeper at the KIX domain and a broader defined KIX (KIX-LONG) to better understand the differences in the published and preliminary work. The role of Tax-AD interfacing with KIX as it relates to transcriptional activation remains unexplored, as well as the potential impact of Tax-AD with KIX homologs. Structural analysis of the KIX domain has identified several “KIX-like” homolog domains in other transcriptional co-activators, implicating a viral multi-step targeting of transcription. Examining the KIX domain homologs will allow exploration into HTLV Tax-AD affinity for KIX-like structures predicted to result in the high viral transcription activati

Identification of Potential Antibiotic to Inhibit Enterococcus Growth

Constance Green

Abstract

The goal of this study is to find novel antibiotics to treat *Enterococcus faecium* bacterial infections. Initial tests from sixteen soil samples found four bacterial isolates that show inhibition of *E. faecium* growth. Soil was used because soil has high levels of bacteria known to produce antibiotics. Identification of these isolates using staining and oxygen requirements indicates that all four isolates are Gram positive, endospore-forming bacilli in the Genus *Bacillus*. Follow-up studies using top agar-cellophane method verified that one of the isolated strains was capable of secreting an antibiotic to inhibit *E. faecium* growth on solid media. Because it is easier to extract antibiotics from liquids, current studies are to determine whether extracts from liquid media will inhibit *E. faecium*. Finally, the potential antibiotic will be identified from either solid or liquid extracts.

The Potential Adaptive Significance of UV Reflective Morphology in Insectivorous Bats

Carlie Jennings

Abstract

Communication in the ultraviolet spectrum has an array of adaptive functions such as foraging, social signaling, etc., and is known to occur in a wide variety of taxa. However, it has not been well studied in mammals. As a result, the prevalence of ultraviolet (UV) communication in mammals remains poorly understood. UV communication requires a social signaling mechanism, such as UV reflective morphology as well as a visual system capable of interpreting wavelengths in the upper UV range (390 nm). Using a UV photography protocol to qualitatively measure UV reflectance of pelage, several bat species were found to possess UV reflective morphology. However, the function of this UV reflection remains unknown. In bats, potential functions include species recognition or prey attraction, among others. We propose that UV reflection is more prevalent in insectivorous bats as an adaptive function of attracting insects. The degree of UV reflectance of species with insectivorous and frugivorous diets was compared using a X2 analysis to investigate the presence of a significant relationship between degree of UV reflection and diet. Results herein suggest that UV reflectance has a higher prevalence in insectivorous than frugivorous species. Because UV reflectance increases the risk of detection by predators, UV reflective signals are likely under strong selective pressure; therefore, there must be some adaptive benefit to possessing such morphology, though further investigation is need

Parasites from Large Intestine of *Trachemys scripta elegans* as Identified using a Scanning Electron Microscope

Dakota Cao

Abstract

Testudines are a heavily parasitized group of poikilotherms and are commonly host to multiple species infection. Much of the available data on the helminth parasites of Oklahoma Testudines is more than fifty years old. Our research is intended to find out anatomical structure and identification of Testudine parasites from the stomach and large intestine using a scanning electron microscope.

Fifty Red-Eared slider turtles (*Trachemys scripta elegans*) were collected from five counties in Southern Oklahoma and one county in Eastern Texas. One common snapping turtle, *Chelydra serpentina serpentina*, was also collected from Garvin County, Oklahoma. These testudines size and sex were recorded, dissected, and organs inspected for parasites. The parasites from the stomach and large intestine will be critical point dried, mounted on stubs, and examined using the scanning electron microscope to assess variation within individuals and identify taxonomic status.

Once valid identification is found for all species, then Analysis of Variance (ANOVA) and t-tests will be conducted to assess associations between geographical location of the host and total parasite load per Testudine host. Simple linear regression analysis will be used to compare size of hosts to number of parasites.

CLUSTERS OF HEALTH OUTCOMES MAPPED BETWEEN 2014 AND 2016 IN TULSA, OKLAHOMA

Michael Poindexter & Mona Easterling

Abstract

Ryne Ashworth, Sophie O'Reilly, Christian Poindexter, Mona Easterling
Tulsa Community College Department of Biology

The use of publicly-accessible data provides an opportunity to examine the number of adult respondents (≥ 18 years) in our city who report 14 or more days during the past 30 days in which their mental health was not good. The 500 Cities Project has incorporated multi-level regression and post-stratification to link geocoded health surveys to produce local level health related estimates. Our hypothesis is that mapping 500 Cities Project data both 2014 and 2016 within the city of Tulsa will show a clustering effect within the city based on census tract. Evidence has shown mental disorders are strongly related to the rates of many chronic diseases including diabetes, cancer, cardiovascular disease, asthma, and obesity. Mental health is an important component of health-related quality of life (HRQOL), a public health concept focusing on health status impacts on quality of life. Maps of the city of Tulsa show clustering of negative mental health outcomes north of Interstate Highway 244 in both reporting years. In these areas, poor mental health outcomes exceed the local average. Oklahoma consistently reports a higher percentage of poor mental health outcomes than the national average in the CDC's Behavioral Risk Factor Surveillance System data.

Identification and Homology Modeling of a Putative Substrate Binding Protein From *Streptococcus sanguinis*, a Pathobiont Involved in Infective Endocarditis

Camille Goerend

Abstract

Streptococcus sanguinis is a pathobiont associated with healthy oral biofilms and is the leading cause of infective endocarditis in humans. *S. sanguinis* expresses a variety of cell surface proteins, most of which still remain uncharacterized. One such cell-surface protein with unknown function is SSA_0908, which is annotated as a single-pass transmembrane protein with similarities to ABC transporter substrate binding proteins. The goal of this project is to elucidate the putative function of this protein by sequence analysis and homology modeling.

SSA_0908 is a 35.2 kDa protein with a conserved domain typical of type 1 periplasmic binding proteins. Protein secondary structure analysis showed structural homology to binding proteins involved in amino acid and sugar transport. Pairwise alignment of SSA_0908 with its closest homolog from *S. pneumoniae* revealed highly conserved residues involved in substrate binding. Substrate specificity in the homologs of SSA_0908 is dictated by glutamine residue, which is involved in hydrogen bond interaction with the imidazole ring of the substrate. This important residue is also conserved in SSA_0908 indicating that the preferred substrate for this protein is probably an aromatic amino acid. The over-all structure of SSA_0908 is typical of substrate binding proteins with two domains composed of sandwich fold connected by a hinge loop. Substrate binding site is located at the interface of the two domains.

Survey of Ixodes scapularis associated pathogens from Odocoileus virginianus at Lake Arcadia in Edmond, Oklahoma.

Russell Smalley IV

Abstract

Odocoileus virginianus (white-tailed deer) is the primary host and vector for *Ixodes scapularis* (deer tick). Most of the research into *Ixodes scapularis* has been geographically restricted to the northeastern United States with limited interest in Oklahoma until now as the *Ixodes* populations spread. Ticks serve as a vector for pathogenic bacteria and viruses that pose a significant human health risk. To date, there has been no research to determine what potential tick-borne pathogens are present in *Ixodes scapularis* at Lake Arcadia. Using a one-step multiplex real-time reverse transcription-PCR we will test for five potential pathogens in *Ixodes scapularis* collected from harvested white-tailed deer.

Extracts from Sea Sponges Inhibit Fibroblast Migration

Makayla McGuire

Abstract

Fibroblasts are the primary cells present in connective tissues of the body and they play a large role in wound healing. Human dermal fibroblasts, in vitro, are used to study cellular processes and stimulate a wound-like environment. Inhibition of fibroblast migration can be a preventative method of treatment among fibroproliferative diseases, such as Dupuytren's Contracture. Our goal was to find natural products that inhibit migration, one of the properties of fibroproliferative diseases. Fibroblasts were plated in an elastomer plug migration assay and incubated at 37°C for two days. On the second day, the elastomer plug was removed to imitate a wound. The size of the wound was then measured. The treatment and media were combined and applied to the cells and incubated for one day. Pictures were retaken the following day. We then obtained measurements from each group. Lastly, the measurements of each treatment were compared to that of the control and data analysis ensued. Treatments were repeated multiple times to ensure the results are replicable. 17 extracts have been tested to date; of these, 5 have inhibited migration. Our goal is to isolate the active ingredients from these 5 extracts using chemistry separation techniques. The results suggest that there are inhibitory properties exhibited by sea sponge extracts. Future research will consist of treatment, using the same sea sponge extracts, on Dupuytren's Contracture cells as a potentially non-invasive

Anti-carcinogenic Effects of Dandelion's Extract on HeLa Cells

Christina Hendrickson

Abstract

Some plant-derived products have pharmaceutical uses for anti-carcinogenic properties. Some of them like dandelion (*Taraxacum officinale*) are well-tolerated and safe for consumption. Dandelion is well-known among Middle Eastern and Chinese people for its anti-inflammatory and anti-carcinogenic effects and is consumed as tea and salad. It is unclear what is the mechanism of effect on cancer cells themselves though. This study investigated the anti-carcinogenic effects of dandelion on HeLa cells. The hypothesis is that the anti-cancer activity of dandelion extract acts by disrupting key cellular processes in tumor cells, which could result in growth inhibition and apoptosis. Dandelion Whole Extract (DWE) was prepared, filtered, lyophilized and resuspended in growth media. HeLa cells and normal human dermal cells (HDF, as control) were maintained under standard conditions then treated with different concentrations of DWE from 8 to 0 mg/ml for 96 hours. Cells were assessed for proliferation, apoptosis, and cell migration. Our results showed that DWE at the dose of 4 mg/ml and lower inhibited proliferation while promoting apoptosis in HeLa cells, but not HDF cells. Cell migration assay showed significant inhibition of HeLa cell migration while HDF cells were not affected and were able to fill in the wound scratch gap in 48 hours. This study supports the possible use of dandelion as a natural source of anti-carcinogenic compounds against cervical cancer.

The Benefits of Sleeping

Phoenix Braswell

Abstract

Some people believe that if they stay and study and get about four hours of sleep, wake up and drink a cup of joe, they will have the same chances as someone who's had a full 8-9 hours' of sleep, but they don't. Other than being tired people who don't get enough sleep put their health at risk in ways they don't even know. Sleep keeps your heart healthy mainly by the way it interacts with the blood vessels, to which a lack of sleep can your blood pressure and cholesterol which are factors of heart attacks and strokes. It can also help to prevent cancer.

Documentation and Genetic Analysis of a Population of Mediterranean Geckos (*Hemidactylus turcicus*) at the University of Central Oklahoma and Surrounding Buildings

Samah Houmam, Briant Nguyen, Madison Birdwell, Allyson Fenwick, & Mari Nguyen

Abstract

The Mediterranean gecko (*Hemidactylus turcicus*) is a small lizard that was introduced to the University of Central Oklahoma (UCO) but has not yet spread to all buildings on campus. It is an exotic, nocturnal species native to the Middle East. We conducted comprehensive surveys of UCO and off-campus buildings around it, detecting colonization in 12 buildings with no previous records. We documented the spread of geckos to 30 buildings on campus and six buildings off-campus in the surrounding community. We collected 34 samples at UCO this semester, making our grand total over a thousand tissue samples. Analyses utilized STRUCTURE and ARLEQUIN software and standard genetic diversity and differentiation tests. Based on preliminary analyses, we found evidence of multiple subpopulations of Mediterranean geckos, but each building was not genetically isolated. We expect the pattern to continue with new samples because the slow migration and physical separation of the geckos increases the probability of subpopulations. We expected populations further from Howell Hall, the introduction site, would show less genetic variation due to a repeated founder effect. However, all populations were similarly low in variation. This project continues to monitor and document the geographic and genetic progress of a population of exotic species as it slowly expands. Data generated will help answer questions about other exotic and possibly harmful species and their adaptations to urban areas.

Evaluating environmental factors influencing the distribution of Mediterranean geckos (*Hemidactylus turcicus*) at the University of Central Oklahoma

Briant Nguyen, Samah Houmam, Allyson Fenwick, & Madison Birdwell

Abstract

The Mediterranean gecko (*Hemidactylus tucicus*) is a small nocturnal vertebrate that originates from the Middle East. Since being introduced to the United States, the Mediterranean gecko has spread all across the country, with Oklahoma being near the expected northern-most range edge in the central region. Within the invaded range, these geckos primarily occupy vertical man-made structures which provide increased light and temperature and contribute to spreading beyond the areas where geckos should be able to range. The Mediterranean gecko is a great test subject as it seems to establish quickly in a site but expands slowly. Understanding the environmental factors affecting these geckos near the edge of their range will contribute to studying adaptation. This project builds on a previous body of data measuring Howell Hall, the original introduction site on campus. We predict that geckos on all buildings will show the same patterns of perch use: little difference between perch and wall temperatures, perch temperatures being warmer than ambient temperatures during cold nights, and little difference between perch lighting and ambient lighting. We expand environmental information to nine other on-campus buildings. We aim to compare perch temperature and light between buildings to understand how Mediterranean geckos are responding to environmental factors at UCO, an extremely local scale.

Effects of Cotinine, a Nicotine Metabolite, and Hyperglycemia on Gingival Fibroblasts In Vitro

Nolan Henning

Abstract

Smoking and diabetes mellitus have been shown to have negative effects on oral wound healing, in part by impairing the function of gingival fibroblasts (GFs). Cotinine, the primary metabolite of nicotine, has also been shown to impair the function of GFs, and we predicted that cotinine's deleterious effects on healing would be more severe in hyperglycemic environments. The effects of cotinine and hyperglycemia were studied using an in vitro wound model to determine if they alter the rate of wound repopulation. We then used video microscopy to observe the behavior of individual cells treated with cotinine and/or hyperglycemia, and F-actin was labelled in cells using fluorescently conjugated phalloidin. Wound repopulation, cell areas, and levels of F-actin were quantified using the NIH ImageJ software. Our data indicate that hyperglycemic conditions adversely affect wound healing in vitro and impair the function of GFs when combined with cotinine. Whereas cotinine alone appeared to accelerate healing, the rate of repopulation was impaired in all wounds treated with cotinine and hyperglycemia. Similarly, cotinine was shown to cause rapid cell contraction when applied to cells grown in hyperglycemic conditions. Short-term and long-term exposure to cotinine had varying effects on levels of F-actin, but hyperglycemia produced consistently lower levels of F-actin and the combination of cotinine and hyperglycemia produced a sustained increase in cellular F-actin.

The Adverse Effects of Antibiotics on Oral Wound Healing

Julia Murray

Abstract

Antibiotics, mainly amoxicillin and clindamycin, are frequently prescribed to patients undergoing oral surgery or dental cleanings as a preventative measure for infections. Although they do provide additional protection against infection, antibiotic use is not without risk. Over-prescription of antibiotics can lead to microbial imbalance of the gut and antibiotic resistance. However, the effect of these antibiotics on healthy cells in an oral wound has not been significantly studied. This study investigated the potential adverse effects antibiotics may have on oral wound healing when given prophylactically. Using the in vitro wound model and gingival fibroblasts, artificial wounds were treated with different concentrations of amoxicillin and clindamycin as would be present in saliva after antibiotic treatment. Every 24 hours, digital images of in vitro wounds were recorded and the cell media were changed, replenishing the levels of antibiotics present. Using the NIH Image J software, the series of wound images were analyzed to determine the rate of wound repopulation. Our results show that administering amoxicillin and clindamycin during the process of wound healing at both low and high concentrations slows the rate of wound repopulation and affects morphological characteristics of the cells.

Development of a Paper-Based Flow Assay for Detection of Staphylococcal Enterotoxins in Food

Mary Tappert & Caitlyn Ransford

Abstract

The goal of this study is to make a paper-based test, similar in concept to a home pregnancy test, for home users and the food service industry to use in the detection and prevention of *Staphylococcus aureus* enterotoxin food poisoning. A series of ELISA assays determined that the toxin, grown in a bacterial culture broth, can be sandwiched between a monoclonal anti-enterotoxin antibody and a polyclonal anti-enterotoxin antibody and detected at a dilution factor of at least 1×10^6 . A flow strip is being developed using these antibodies to detect the presence of *Staphylococcus aureus* enterotoxins in a sample of food.

Using Axenic Media to Determine how *C. burnetii* is Adapted to Life in an Intracellular Environment

Melissa Brewer & Erika Lutter

Abstract

Coxiella burnetii is an obligate intracellular bacterium and the causative agent of Q fever. It is well established that *C. burnetii* undergoes a “phase transition” from virulent (phase I) to avirulent (phase II) caused by truncation of LPS. Phase I *C. burnetii* undergoes this phase change when passaged in embryonated eggs or tissue culture. Recently, an axenic media, Acidified Citrate Cysteine Media (ACCM), was developed allowing for the growth of *C. burnetii* outside of the host cell. It has also been shown that the phase transition occurs when phase I *C. burnetii* is passaged in ACCM. However, it is unclear what other molecular systems may change when the stressors of a cellular environment are removed. We used a reverse evolution approach to address this gap in our understanding of how *C. burnetii* adapts to life within a host cell during infection. We hypothesized that global protein changes would occur during early and long-term passages after inoculating ACCM with host cell propagated *C. burnetii*. Following passages in ACCM, we found that the number of infectious units decreased, protein changes were detected in mass spec data with the first five passages and that significant reduction of proteins known to be necessary for infection could be detected by western blotting within the first ten passages. We have found that early changes are occurring following passages in ACCM, leading to a promising avenue to study how *C. burnetii* is adapted to the intracellular e

Establishment of Long-term Vegetation Sampling at UCO's Selman Living Lab to Analyze the Impact of Plant Cover, Community Composition, and Ground Cover on Small Mammal Populations

Vatsal Lotwala, Gloria Caddell, & Chad King

Abstract

As part of a long-term study of factors impacting small mammal population and community persistence, plant cover, plant community composition, and ground cover are being monitored at the Selman Living Lab, UCO's biological field station in the Cimarron Gypsum Hills in Woodward County. Each season, vegetation and ground cover are sampled by a point-intercept method at 600 points on three permanent webs: gypsum outcrop, grassland, and gypsum outcrop/grassland. Data from March 2018 through January 2020 show that plant cover was highest in the grassland and lowest on the outcrop. Sixty-nine species (20 graminoids, 45 forbs, 3 shrubs, 1 tree) were encountered, of which 97% were native. The highest number of species was on the grassland web and the lowest number on the outcrop. Only 14 species were common to all three webs, and Sorenson's community similarity for pairs of webs ranged from 50-57%. Cryptogamic crust represented the highest percent ground cover on the outcrop, whereas litter represented the highest percent ground cover in the grassland. The number of species and the number of graminoids and forbs encountered during the 2019 growing season was higher than in 2018 for all webs. Changes in vegetation between the two years might be due to an increase in precipitation from 2018 to 2019, and recovery from fires that occurred in 2016 and 2017. The vegetation data will be used in mathematical models to help identify the impact of vegetation on rodent populations.

Characterization of the impact of syringafactin on human pathogen chemotaxis and membrane permeability

Regina McGrane

Abstract

Pseudomonas syringae is a bacterium that can colonize leaf surfaces and cause plant diseases. Under cool, moist conditions *P. syringae* can induce motility and enter plant tissues becoming a disease-causing pathogen. *P. syringae* secretes lipoproteins called biosurfactants. The biosurfactant syringafactin has been shown to enhance surface motility and promote nutrient and water diffusion from plant cells. Our laboratory has demonstrated that syringafactin repels and kills competing bacteria, suggesting it may be useful for treating bacterial infections. The objective of this work was to investigate the mechanisms of repulsion and identify how syringafactin kills bacteria. Results demonstrated that repulsion occurs via the competitor's chemotaxis pathways. The minimum concentration of syringafactin required to kill the human pathogens *Salmonella enterica*, *Pseudomonas aeruginosa*, and *Escherichia coli* was identified. Syringafactin can kill *P. aeruginosa* at much lower concentrations compared to concentrations required to kill *E. coli*. Antimicrobial biosurfactants produced by other bacteria increase cell permeability leading to cell lysis; therefore, the impacts of syringafactin on membrane permeability was tested. Each human pathogen exhibited increased membrane permeability following syringafactin exposure. Collectively, this work aims to evaluate the potential use of syringafactin as an antimicrobial agent in the prevention of disease outbreaks.

Observing the Presence of Ultraviolet Reflectance in Crepuscular and Nocturnal Strigiform Plumage

Bailey Kephart

Abstract

Strigiformes have been established as capable of interpreting ultraviolet light without ultraviolet sensitive (UVS) cones, however not much is known about how owls utilize and interpret UV reflection. In this study, I analyzed the presence of UV reflectance in four owl species, with two deemed as nocturnal and two deemed as crepuscular in activity. To find UV reflectance, I photographed specimens from various ornithological collections with a UV-sensitive lens. I then recorded the presence or absence of visible UV coloration and compared the results with a X2 goodness-of-fit test. I found no statistically significant difference among nocturnal and crepuscular species observed, as the majority of specimens reflected UV light in some variance. Because the majority of owl specimens in this study reflected UV light regardless of crepuscular or nocturnal activity, it is possible that owls that are active at night, dawn, and dusk all have the ability to engage in intraspecific UV communication.

Pattern Recognition: How Exposure to Patterns Alters Reaction Time

Shiny Christian

Abstract

Pattern recognition describes the cognitive process matching information from a stimulus with information retrieved from memory. This experiment examines whether the number of times a subject is exposed to a pattern will affect the amount of time it takes to recognize and react to changes in that pattern. We hypothesize the reaction time to recognize and deactivate lights in a pattern will decrease. We also hypothesize the accuracy of deactivating lights in a pattern will increase with repeated exposure. In this experiment, 10 people were asked to recognize a change in patterns throughout 3 different trials. Each person had 3 trials with 3 different patterns for each trial. They had 4 seconds to memorize the pattern and 6 seconds determine the change in the pattern. Data analysis indicates as females are exposed to a pattern over time, their ability to recognize changes in that pattern increases. Subjects were more likely to choose the correct light over time. Subjects made fewer wrong choices the more they were exposed to the original pattern. There is a correlation between the increase in correctness and a lack of wrong choices. No significant increase in reaction time between trials was found.

Farming and the Hygiene Hypothesis

Gunner Parent

Abstract

The increased prevalence of allergic disease over the past decade, and the claims of the hygiene hypothesis, has led to increased allergy research in relation to different environments. We conducted a retrospective chart review to statistically determine whether growing up on a farm provides a protective effect against allergies based on the hygiene hypothesis. Data collection consisted of an SQL query. All patients from a single rural ENT Allergist in Southern Oklahoma from 2012-2018 are included in the study. Patient data was de-identified and formatted in excel for statistical analysis. Python software was utilized to determine the significance between patients who grew up on a farm and patients who did not grow up on a farm in relation to having allergies. Our results determined a statistical difference between the prevalence of allergic rhinitis in patients who grew up on a farm and patients who did not grow up on a farm (p value = 0.000302). Our results revealed that patients who grew up on a farm were more likely to have allergies compared to patients who did not grow up on a farm. In our patient population, those who did not grow up on a farm were statistically less likely to have allergic rhinitis compared to patients who grew up on a farm. A possible confounding variable for our findings may be incidental exposures to farming environments due to living in close proximity to local farms.

Invasive fungal species imported on melons from Guatemala

Patrick McDowell

Abstract

Melons (Cantaloupe; *Cucumis melo* var. *cantaloupensis*) were purchased from local grocers in 2016-2019 and observed for post-harvest diseases, specifically fungal diseases. Of the 80 melons purchases in 2019, approximately 75% developed fruit rot symptoms caused by fungi. The diseased tissue indicated that the majority of lesions were caused by *Diaporthe* spp., and to a lesser extent lesions were caused by *Alternaria* and *Fusarium* spp. Plant pathogens such as *Diaporthe* spp. enter the surface of the melon fruit early in developmental stages and remain latent until the fruit matures. While ripe fruit is imported with no external evidence of disease, internal fruit rot becomes evident as the fruit matures. The objective of this study was to characterize those fungal species imported via Guatemalan melons. Fungal isolates were characterized based on culture growth characteristics, spore morphology, and DNA analysis. A majority of Guatemalan isolates were morphologically similar to *D. sojae* and *D. curcurbitae*. DNA was extracted from fungal hyphae and purified PCR products were sent to Eurofin, Inc. for sequencing. Sequencing analysis showed that some of the isolates were a match for *D. pterocarpi* and species within the *D. arecae* complex. Our findings of pathogenic *Diaporthe* spp. suggests that plant pathogens are carried across international borders and imported into the US. Further analysis is being conducted on melons collected in 2019 with multiple DNA primers to ensure accuracy.

3-Dimensional Design, Construction, and Testing of a Series of Feeding Apparatuses for Insect Feeding Behavior Research

Raistlin Hiner & Jimena Aracena

Abstract

Fruit flies (*Drosophila melanogaster*) are ideal models to test animal behavior in the laboratory. Particular foraging behavioral questions require construction of arenas and feeding equipment for testing at the appropriate scale for the small size of this animal (about 3mm). We used 3-D printing to construct very precise small feeding platforms (patches of food) with minute wells of particular shapes that contained set volumes of liquid food (usually sugar solutions). For this purpose, we used the graphic design program Tinkercad™ to construct the patches from various geometric forms, including cubes, cylinders, and ellipsoids. The patches are constructed using a Dremel DigiLab 3D printer with ECO-ABS Filament material. Initial behavioral tests using the resulting food patches shows that the finishing quality, dimensions, and shapes constructed are ideal for behavioral testing and that the flies readily feed from the food in the wells inside the patches.

Infertility Treatment: Reality Versus Perception

Nathaniel Briggs

Abstract

The use of publicly-accessible data provides an opportunity to examine trends in infertility treatment. Assisted reproductive technology (ART) is used to treat infertility. In the US, fertility clinics report and verify numbers of ART cycles started and carried out in their clinics to the CDC. This data is accessible to the public in annual reports. 2016 CDC ART Surveillance report will be used to review the realities of fertility clinic accessibility and national success rates. We hypothesize that public-health campaigns regarding fertility treatment will increase Google search queries on the topic. Google trends was used to examine perceptions by comparing US searches for three terms (infertility, infertility awareness and male infertility) during the three years 2015-2017. These results show steady public queries as well as a regular increase in searches during an annual public-health campaign. Understanding the relationship between reality and perception regarding physical accessibility to fertility treatment, reported success rates, and search terms will be vital to addressing the public-health issue of infertility.

Infertility Treatment: Reality Versus Perception

Mona Easterling

Abstract

The use of publicly-accessible data provides an opportunity to examine trends in infertility treatment. Assisted reproductive technology (ART) is used to treat infertility. In the US, fertility clinics report and verify numbers of ART cycles started and carried out in their clinics to the CDC. This data is accessible to the public in annual reports. 2016 CDC ART Surveillance report will be used to review the realities of fertility clinic accessibility and national success rates. We hypothesize that public-health campaigns regarding fertility treatment will increase Google search queries on the topic. Google trends was used to examine perceptions by comparing US searches for three terms (infertility, infertility awareness and male infertility) during the three years 2015-2017. These results show steady public queries as well as a regular increase in searches during an annual public-health campaign. Understanding the relationship between reality and perception regarding physical accessibility to fertility treatment, reported success rates, and search terms will be vital to addressing the public-health issue of infertility.

Influence of Incubation Temperature on Antimicrobial Production by Isolated Soil Bacteria

Kadin Falkensten & Neil Enis

Abstract

New antibiotics are urgently needed to address the serious threat to global health posed by the emergence and proliferation of modern antibiotic-resistant pathogens in conjunction with declining rates of new antimicrobial drug discovery. Relatively simple protocols have been established to isolate and screen soil bacteria for potential antibiotic production and are being successfully employed in popular course-based undergraduate research curricula such as Small World Initiative (SWI) and Tiny Earth (TE). Because microbial metabolism and growth can be profoundly influenced by environmental conditions and current screening protocols sometimes specify incubation at a single predetermined temperature, we sought to evaluate the effect of varying incubation temperature on detectable antibiotic production by soil bacteria previously isolated by students in undergraduate Microbiology courses at Tulsa Community College utilizing SWI and TE curriculum. In this experiment, we determined the frequency at which soil isolates inhibited growth of nine test organisms when incubated at room temperature, 30°C, and 37°C. Cells of the test organisms were spread to form bacterial lawns on LB (lysogeny broth, aka Luria-Bertani) agar plates; sterile paper disks inoculated with soil isolates were subsequently added to the surface of each plate. After approximately 24 hours incubation at the three test temperatures, soil isolates were evaluated for potential antibiotic production as evidenced by zon

Isolation, Purification, and Characterization of a New Arthrobacteriophage Rizwana from Compost Soil.

Umar Sahi

Abstract

Bacteriophages are obligate, intracellular viruses that infect bacteria by utilizing ligands specific to bacterial receptors. *Arthrobacter* sp is a bacterium found in the Actinobacteria phylum and the genus *Arthrobacter*. *Arthrobacter* sp. are Gram-positive bacteria that have a rod morphology during exponential growth and cocci during the stationary phase. Due to their rapid growth and well-defined life cycle, *Arthrobacter* sp. are used in industrial and laboratory settings. Few arthrobacteriophages have been discovered and characterized, and there is still a need to find more. This research seeks to isolate novel arthrobacteriophages found in Oklahoma soil that infect host bacteria *Arthrobacter* sp. KY3901. Phage isolation was done by collecting soil from the Norman compost facility in Norman, OK. (35.174053 N, 97.444489 W). Phage was isolated through direct isolation method. Three plaque purifications were done through picking a single plaque and diluting the plaque in phage buffer. High-titer lysate was obtained and the phage genome was extracted using PCI method. The bacteriophage was named Rizwana. The phage forms clear, pinhead shaped plaques on the host bacterial lawn. Rizwana phage has a siphoviridae morphotype. The phage was sequenced and found to be a lytic DNA virus. The GC content of the phage is 63.6% with a total genomic length of 65,823 bp.

Testing the Infectivity of Arthrobacteriophages Isolated from Oklahoma Soil

Peace Chinedu

Abstract

Arthrobacter sp. belong to the phylum Actinobacteria. They are Gram-positive coryneform bacteria with a non-fermentative metabolism. They are mostly found in the environment (soil, water, plants, sewage etc.). However, three Arthrobacter species namely Arthrobacter cummingsii, Arthrobacter woluwensis, and Arthrobacter Albus have been isolated from humans. For this project, we wanted to test the host range of six arthrobacteriophages we isolated using host bacteria Arthrobacter sp. KY3901. We hypothesize that our phages have a very narrow host range and will not be able to infect the human isolate of A.albus.

Segregation in Little Rock Public Schools: A 20 Year Analysis

Cherokee Anderson & Liz Lane-Harvard, Ph.D.

Abstract

During the late 1950's, Little Rock, Arkansas's Central High School played a pivotal role in the history of desegregation in United States public schools. In recent years, however, court mandated desegregation measures have started to expire, leading to demographic shifts in the Little Rock Public School District. In this poster, we analyze racial trends in the district over the past 20 years. This is done by using a combination of ecological diversity measures and geospatial analysis. Geospatial analysis is used to compare current attendance zones and Voronoi attendance zones.

Comparison of suicide death rates between Native Americans and total population in the state of Oklahoma

Leslie Moore, Rylee Dunlap, & Ning Wu

Abstract

The suicide rates in Native American population have been known to be higher than that of US total population national wide. However, this trend may not apply to all the states. This study focuses on exploring the different suicide rates over the total death between American Indian (AI) and total population in Oklahoma. Numbers of suicide and total death were retrieved from CDC, US Census Bureau, and OK2Share databases from 2006 to 2015. The percent of suicides contributed by AI to the total suicide of Oklahoma was 96-134% comparing to that of the whole country 169-193%. The rate of suicide per total death showed that the highest suicide rates occurred in the 20-24 age group for AI and 45-49 age group for OK total population. The top three age groups for AI suicide in OK were (1) 20-24, (2) 35-39, (3) 25-29 and (1) 45-49, (2) 50-54, (3) 40-44 for OK total population. Comparison studies to the suicide rate of AI and US total population national wide showed that the highest suicide rates occurred in the 15-19 age group for both AI and US total population. The top three age groups for AI were (1) 15-19, (2) 20-24 and 10-14. The top three age group for US total population were (1) 15-19, (2) 20-24, (3) 10-14. The results demonstrated that Oklahoma state has lower AI suicide rate than that of national wide AI population. In addition, the top three suicide rate age groups in OK are older than national AI and total population. Further studies will focus on the social, economic, and

Winter Ecology of Mediterranean Geckos (*Hemidactylus turcicus*) at the University of Central Oklahoma

Madison Birdwell, Mari Nguyen, & Allyson Fenwick

Abstract

The Mediterranean gecko (*Hemidactylus turcicus*) is an exotic and nocturnal species. As an ectotherm, it is strongly influenced by environmental temperatures. Central Oklahoma is near the northern end of the species' range estimated by environmental range mapping. Previous work in introductory biology courses found geckos active in January. Our objective was to characterize gecko density year-round, including temperatures of observed geckos and ambient temperatures when observed. We chose the original introduction site of Howell Hall and a more distant building, Communications. The buildings are surveyed once per week, year round. For each gecko observed we measure the temperature of the individual plus other wall sites. We also measure ambient temperature, light and other factors. We found that the density decreases in the colder months, but does not disappear completely as expected from a reptilian species. These geckos have been found at temperatures below their critical thermal minimum of 10 C. Preliminary analysis finds that geckos are not choosing sheltered spots compared to other areas they could have chosen. Geckos are slightly warmer than ambient temperature but the magnitude of difference may not be biologically relevant. The conclusion that individuals are choosing locations on the buildings that are the same as others leads observers to support laboratory conclusions that *H. turcicus* is a poor thermoregulator.

Foraging behavior of fruit flies (*Drosophila melanogaster*) on patches of sugar: the effects of distance and food quality

Caden Bowles & Jimena Aracena

Abstract

Animals use searching mechanisms that maximize energy while foraging on patches, which are food sources arranged in groups. Fruit flies (*Drosophila melanogaster*) are ideal models to test animal behavior in the laboratory. We can manipulate food quality, volume, and distribution. In this experiment, we intended to test the effect of food concentration and distance between patches of food on their foraging behavior. We placed two patches (6.8cm²) of sucrose solutions (one with red 0.25 M and one with blue 0.125 M sucrose) at five distances from each other (0, 0.5, 1, 2, and 4 patch spaces). We allowed 100 flies to feed in the dark and scored them according to their abdomen color. We predicted that as distance decreases, the flies will be able to select the higher concentration (better) patch. Flies can walk on vertical surfaces and fly between patches of food. Therefore, we also propose to test their foraging behavior and orientation on 3-D cubic and spherical patches, which we are designing with Tinkercad™ and a Dremel DigiLab 3D printer with ECO-ABS Filament material.

Expression Patterns of Murine Phenylalanine Hydroxylase Using Reverse Transcription Polymerase Chain Reaction

Cassandra Ortiz

Abstract

Reverse transcription polymerase chain reaction (RT-PCR) is currently the most viable option for quantifying gene expression. This ability to detect and quantify low levels of messenger RNA is used in molecular medicine, forensics, virology, and microbiology. Fluorescent, real-time, RT-PCR quantifies the target gene copy number against a normalized, house-keeping gene by using a statistical threshold of fluorescence called the cycle threshold (CT). Through a two- enzyme/one-tube reaction, the risk of contamination is reduced. An initial reverse transcription of the messenger RNA into complimentary double stranded DNA is necessary before polymerase chain reaction can begin. Phenylalanine hydroxylase deficiency results in intolerance to dietary intake of the essential amino acid phenylalanine with severe deficiencies resulting in phenylketonuria. The first aim of the investigation included the comparison of phenylalanine hydroxylase (PAH) transcription in mice using heart and liver messenger RNA with r18S as a normalizer. The second aim of the investigation included a study of the introduction to the technique in the first two years of postsecondary study. The hypothesis was that PAH expression is greater in liver vs. heart tissue. Methods included reverse transcription and PCR enzymes with primers, buffers and dNTPs in the BioRad iQ5 iCycler using SYBR Green. Liver cells produce more PAH than heart cells. The fold difference was 891.4 in liver cells as compared to heart cells.

In Vitro Evaluation of PEGDA-PCL Laser Scaffold

Sannam Salarvandi

Abstract

Polyethylene Glycol Diacrylate (PEGDA) tissue scaffolds were shown to have limited applications in tissue engineering due to the inability of cells to adhere and migrate within the scaffold. Our lab has developed a PEGDA-based composite scaffold with microscopic holes that are created using a laser machine, while wrapping the scaffold with poly-e- caprolactone nanofibers. This study examined the physical, mechanical, and biological properties of PEGDA-PCL and PEGDA - PCL- Laser scaffolds to determine the effect of the laser holes on PEGDA. Our goal is to determine whether the lasered PEGDA - PCL scaffold absorbs nutrients with time and can provide an ideal environment for the survival of cells. Furthermore, cell viability tests indicate that the cell adhered, proliferated, and migrated in the PEGDA-PCL- Laser scaffold. This novel PCL-PEGDA would provide an environment required for enhancing tissue integration with native tissue that produces better clinical outcomes for cartilage repair or regeneration.

Plant-Pollinator Network of a Gypsum Outcrop Community in the Cimarron Gypsum Hills of Northwestern Oklahoma

Gloria Caddell & Gabriel Rucci

Abstract

A pollination network is a compilation of plants and their flower-visiting animals, and is focused on community level interactions. This study will describe and analyze the pollination network of the native plant community on gypsum outcrops at the Selman Living Lab in the Cimarron Gypsum Hills of northwestern Oklahoma. On 31 days throughout the growing seasons of 2018 & 2019, insect visitors to flowers of all flowering plants on two gypsum outcrops were recorded in the early morning, early afternoon, and late afternoon. Visits by 86 species of insects were recorded to 25 plant species. Connectance, the percentage of all possible interactions that occurred, was 13%. Linkage, the mean number of taxa with which plants or pollinators interact, was 11 for plants and 3 for insects. Insects were categorized into functional groups, and the richest group was beetles. The usefulness of the pollination syndrome concept in predicting the pollinators of plants in this community will be evaluated. Further analysis will provide information on temporal differences in connectance and linkage throughout the day, throughout the growing season, and between years. Results will be compared to networks from grassland communities at similar latitudes, and in various other habitats.

Differences in Coding Sequence Between Bats and Humans in the Tumor Suppressor Gene PTEN

Madelyn Goodman

Abstract

As the average human lifespan increases, so does the risk of developing age-related diseases. Cancer is among the most common of these diseases and is a leading cause of death. Therefore it is imperative to advance methods of prevention and treatment for age-related diseases. Despite the correlation between cancer incidence and age in humans, bats are the longest living mammal of their size and rarely develop cancer. Our study aims to examine the differences in the coding sequence of the tumor suppressor gene PTEN in humans and bats. The PTEN (phosphatase and tensin homolog) protein inhibits cellular proliferation, survival, and motility. The normal function of the PTEN protein is commonly lost in human cancers and its deregulation causes implications in many other diseases. The PTEN gene is also found in bats and differences in coding sequence or regulation could possibly explain their resistance to cancer. We took wing punch samples from two species of bats (*Myotis velifer* and *Tadarida brasiliensis*) and separated the RNA. Then we converted the RNA into cDNA and isolated the PTEN gene using PCR and gel electrophoresis. A comparison of 350 base pairs of the coding sequence revealed 11 base changes and only one amino acid change unique to humans. These are preliminary results and interestingly PCR amplified multiple fragments, which may indicate alternative splicing is occurring in these bats.

Type I IFN Production by Bone Marrow Dendritic Cells induced by GC in Laser Immunotherapy

Sara Zukerman

Abstract

N-dihydrogalactochitosan (GC) is a novel immunostimulant that has been used to treat metastatic cancers in tandem with photothermal therapy (PTT). PTT+GC, also termed laser immunotherapy (LIT), has shown promise in pre-clinical and preliminary clinical studies. However, the mechanism of LIT is not clear, particularly how GC interacts with the immune system and, more specifically, dendritic cells in order to produce the desired immunostimulatory effect. It is believed that GC activates dendritic cells to produce type I interferons (IFNs). Understanding these interactions will provide invaluable insight as to how GC is able to induce an antitumor immune response. This study is to investigate both the effect of type I IFN on the activation of DCs by GC, but also on the antitumor immune responses induced by LIT.

Bioinformatics Investigating Parkinson's Disease

MacKenzie Mims

Abstract

Parkinson's Disease is a hereditary disease that affects approximately 60,000 people in America today. It affects the substantia nigra in the human brain which leads to tremors, slowness in movement, loss of sense of smelling and difficulty in maintaining balance. The disease is far more complex than one would think due to the severe damage that is done to the brain causing the loss of production of the important neurotransmitter dopamine. We utilized bioinformatics, which is the science of gathering and analyzing intricate biological data. The mutated gene, DJ-1, is on the chromosome number 1. We investigated the mutated gene implicated in susceptibility to Parkinson's Disease. There is no cure for the disease. The CT scans revealed absent dopamine neurons. We concluded that there is degeneration of dopaminergic neurons in the pars compacta of the substantia nigra.

Potential Distribution of the Biocontrol Agent *Toxorhynchites rutilus* by 2070

Daniel Marshall & Chris Butler

Abstract

Climate change projections indicate that mosquito distributions will expand to include new areas of North America increasing human exposure to mosquito-borne disease. Controlling these vectors is imperative, as mosquito-borne disease incidence will rise in response to expansion of mosquito range and increased seasonality. One means of mosquito control used in the United States is the biocontrol agent, *Toxorhynchites rutilus*. Climate change will open new habitats for its use by vector control organizations, but the extent of this change in habitat is currently unknown. We used a maximum entropy approach to create species distribution models for *Tx. rutilus* under four climate change scenarios by 2070. Mean temperature of warmest quarter (22.6°C to 29.1°C), annual precipitation (1025.15 mm to 1529.40 mm), and precipitation seasonality (≤ 17.86) are the most important bioclimatic variables for suitable habitat. The centroid of current possible habitat distribution of *Tx. rutilus* is in central Tennessee. Depending upon the scenario, we expect centroids to shift north-northeast by 97.68 to 280.16 km by 2070. The extreme change in area of greater than 50% suitable habitat probability is 141.14% with 99.44% area retained. Our models indicate limited change in current habitats as well as creation of new habitats. These results are promising for North American mosquito control programs for the continued and potential combat of vector mosquitoes using *Tx. rutilus*.

Survivorship of *Aedes aegypti* and *Culex quinquefasciatus* in the Presence of a Natural Enemy

Daniel Marshall

Abstract

Larvae of the predatory *Toxorhynchites* mosquitoes feed on aquatic invertebrates including other mosquitoes. Adults feed on nectar, never blood and are thus incapable of transmitting human or animal pathogens. Due to their unique feeding behaviors and ability to target larval mosquito habitats, *Toxorhynchites* spp. are used as natural enemies by mosquito control professionals. In the United States *Toxorhynchites rutilus* is used across much of the Gulf Coast where it reduces populations of *Aedes aegypti* and *Culex quinquefasciatus*. The extent of predatory control *Tx. rutilus* exerts on these vectors is currently unclear. Here we observed survivorship of *Ae. aegypti* and *Cx. quinquefasciatus* in the presence of *Tx. rutilus* to determine the efficacy of the predator and infer a prey preference. To measure survivorship, we exposed prey to a single predator for 12 hours. During this time we observed mortality and time of attack. We report 43.5% reduction in *Ae. aegypti* (N=390) and 45.7% reduction in *Cx. quinquefasciatus* (N=350). Cumulative survivorship probability at 12 hours for *Ae. aegypti* is 0.43 and 0.46 for *Cx. quinquefasciatus*. Our results indicate no significant difference in survivorship or predation rate between prey species. Mosquito control professionals should be aware that *Tx. rutilus* does not display a preference between *Ae. aegypti* and *Cx. quinquefasciatus*. Releasing the predator into habitats with both species will result in approximately equal control.

Rac and Rho Regulation of Compaction and Contraction in Collagen Matrices Visualized With Optical Coherence Tomography

Natthapume Attamakulsri, Gang Xu, & Mel Vaughan

Abstract

Dupuytren's contracture (DC) is a condition where connective fibrous tissue continuously grows on the palm of the hand and attaches to the tendon sheaths, resulting in a scar-like deformity. The cell believed to be responsible for DC is the myofibroblast. Myofibroblasts, when placed within an anchored collagen matrix create migration and contraction properties, similar to what is seen in DC. Migration is focused on lamellopodia movement, while contraction focuses on stress fibers. Both properties are regulated by small G-proteins labeled Rac and Rho, respectively. We focused on the study of Rac and Rho regulation on myofibroblast compaction and contraction in collagen matrices in vitro. We asked whether Rac and Rho regulation would affect anchored collagen tension. The methods involved culturing anchored collagen cell matrices for 3 days to allow for tension generation. We added Rac and Rho inhibitors, waited one hour to allow for maximum inhibitory effects, and measured matrix height utilizing optical coherence tomography (OCT). OCT was used to monitor collagen tension development under anchored conditions. Our results show inhibition of Rho and Rac reduced compaction; however, Rho inhibition was more effective, suggesting the stress fiber organization of actin was more important to compaction than the migration-related actin organization.

Treatment of pyelonephritis using drug-encapsulated liposomes

Alejandro Torres

Abstract

Urinary tract infections (UTIs) affect millions of men, women and children. Majority of UTIs are caused by uropathogenic *Escherichia coli* (UPEC). Some invasive UPEC can evade immune surveillance and effects of antibiotics by invading between the tissues and internalizing into the host epithelial cells. These UPEC can also ascend the urinary tract and colonize kidneys, resulting in pyelonephritis. If left untreated, pyelonephritis can progress to organ failure, sepsis, and death. Due to the increase in antimicrobial resistance and invasiveness of UPEC strains, innovative alternatives to antibiotics are essential to effectively treat UPEC. In the current study, we hypothesize that using biocompatible drug-encapsulated liposomes as therapeutic agents can effectively aid in treating pyelonephritis caused by intracellular uropathogens. To test this hypothesis, our model comprised of an invasive strain of *E.coli* that was used to infect the human kidney HK-2 cell line. Our preliminary results show that ciprofloxacin-encapsulated liposomes did not induce cytotoxicity or affect cell viability at the tested concentrations. We were also able to determine that liposomes can interact with the HK-2 cells through flow cytometric analyses. These findings suggest that liposomes are promising candidates that can be used therapeutically in kidney cells and more investigations are needed to determine if they can be used to treat pyelonephritis.

Investigating the use potential use of reduced graphene oxide-low-density lipoproteins (rGO-LDL) in laser immunotherapy for cancer treatment

Kyra Gallagher & Sara Zukerman

Abstract

This study focuses on the possibility of using a nanoparticle synthesized of reduced graphene oxide (rGO) and low-density lipoproteins (LDL), which has been dubbed rGO-LDL in conjunction with laser immunotherapy (LIT) cancer treatment. RGO-LDL was synthesized with the idea that, since cancer cells tend to uptake LDL and deplete healthy cells of it, and since graphene derivatives like rGO have been documented to have excitation wavelengths in the near-infrared (NIR) range that many light-based therapies operate in and to interrupt the production of a cytoskeletal structure, their combination could theoretically aide in cancer therapy. Previously, much characterization of the nanoparticle has been done. This study builds upon what is known of rGO-LDL and, further, deduces its potential applications in cancer treatment, specifically under laser irradiation. The surface features of rGO-LDL are observed via scanning electron microscopy (SEM). In investigating rGO-LDL's interaction in cell culture, the inherent toxicity was tested in the 4T1 cell line. The cytotoxicity of rGO-LDL is tested with a gradient of concentrations via incubation with tumor cells. The results of this study will be valuable to guide the use of rGO-LDL for cancer treatment using photo-immunotherapy.

Antibacterial Activity of Extracts of Brassica oleracea var. botrytis and Brassica oleracea var. capitata.

Matthew Clark & KJ Abraham

Abstract

Matthew Clark and KJ. Abraham Department of Biology, Langston University, Langston, OK.

Natural chemicals from plants are medicinally important and are a good source of new antibiotics to combat microbes that have developed resistance to some of the currently used antibiotics. The objective of the experiment is to test for antibacterial activity in Brassica oleracea var. botrytis and Brassica oleracea var. capitata. The hypothesis is that both B. oleracea var. botrytis and B. oleracea var. capitata will both show antibacterial properties. The stems of B. oleracea var. botrytis and B. oleracea var. capitata were oven dried, powdered, and extracted using a Soxhlet Apparatus with methanol. Different concentrations of methanol and water fractions were tested on Bacillus brevis for antibacterial activity. Methanol fractions inhibited bacterial growth in 48 hours while water fractions showed no effects. Extracts from red cabbage indicated no antibacterial activity. Methanol extracts shows promise and potential for use as natural plant antibiotics in medicine in the future.

Molecular mechanisms of teratogenicity of Phenylalanine in MPKU

Kayley Pate

Abstract

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], brain and growth restriction when a mother with Phenylketonuria [PKU] does not control her dietary intake of Phenylalanine [Phe]. However, the mechanisms responsible for Phe-induced CVMs are poorly understood. In this study, we aim to determine the effect of Phe on the transcriptome and development of an avian model of MPKU. Preliminary data determined two pathways, Retinoid (RA) and Focal Adhesion (FA), were significantly enriched. In review of the literature RA signaling is important in heart development and increases or decreases in levels of RA can cause significant developmental defects. Additionally, FA signaling effects cell behaviors including cell motility, proliferation, and survival. Methods: RNA-Seq-Fertilized chicken eggs were treated with 2500uM PHE through yolk injection at HH6. Embryos were incubated until HH14 and then dissected. The head/cranial region and the thoracic/cardiac region were dissected. For the control group, 3 embryos were pooled and 2 embryos were used for treated for a total of 3 samples. RNA was isolated and shipped to Applied Biological Materials for enrichment for mRNA, library construction, and sequencing on the Illumina NextSeq500. Data was analyzed with the open source software Galaxy Suite. QPCR was conducted on staged matched embryos for genes in heart development and the Retinoid Pathway (RA), and Hepatocyte.

Contamination or Community? Testing for Bacterial Provenance in Monoculture Diatom Sequencing Data

Gary Thomas

Abstract

Diatoms are single celled organisms with a silicized shell, found in nearly all bodies of water on the earth. Diatoms account for 20% of global photosynthesis, are highly diverse, and account for a vital carbon source at the base of marine food chains. Diatoms take part in critical cross-domain relationships with bacterial species, involving exchange of B vitamins, organic carbon, iron, phosphorous, and nitrogen. We sequenced five diatom monocultures and recovered diverse microbial communities, including four complete bacterial genomes residing in a monoculture of the diatom *Psammoneis japonica*. We tested for the presence of these bacteria in remaining diatom cultures, to determine whether their presence was due to cross-sample contamination or if they were natively associated with *Psammoneis*. We first filtered sequencing data using the program Trimmomatic. We then assembled the data using Ray assembler, which allows assembly from large and complex metagenomic datasets. Finally, we used TAGC Plots and BLASTn with a custom database to test for presence of bacteria in diatom cultures. We found very limited evidence of presence of only a single identified bacterial species in one non-*Psammoneis* culture, supporting that at least three of four bacterial species in *Psammoneis* culture are natively present with this diatom species, and are not due to laboratory cross-contamination.

Contamination or Community? Testing for Bacterial Provenance in Monoculture Diatom Sequencing Data

Dr. Matthew Parks

Abstract

Diatoms are single celled organisms with a silicized shell, found in nearly all bodies of water on the earth. Diatoms account for 20% of global photosynthesis, are highly diverse, and account for a vital carbon source at the base of marine food chains. Diatoms take part in critical cross-domain relationships with bacterial species, involving exchange of B vitamins, organic carbon, iron, phosphorous, and nitrogen. We sequenced five diatom monocultures and recovered diverse microbial communities, including four complete bacterial genomes residing in a monoculture of the diatom *Psammoneis japonica*. We tested for the presence of these bacteria in remaining diatom cultures, to determine whether their presence was due to cross-sample contamination or if they were natively associated with *Psammoneis*. We first filtered sequencing data using the program Trimmomatic. We then assembled the data using Ray assembler, which allows assembly from large and complex metagenomic datasets. Finally, we used TAGC Plots and BLASTn with a custom database to test for presence of bacteria in diatom cultures. We found very limited evidence of presence of only a single identified bacterial species in one non-*Psammoneis* culture, supporting that at least three of four bacterial species in *Psammoneis* culture are natively present with this diatom species, and are not due to laboratory cross-contamination.

Pulmonary Dendritic Cell Subset Interactions with *Cryptococcus neoformans*

Brenden Determann II

Abstract

Cryptococcus neoformans is an opportunistic fungal pathogen acquired by inhalation that causes cryptococcal meningitis. This disease results in over 180,000 annual deaths in patients with AIDS. Innate phagocytes in the lung can kill *C. neoformans*, or it can evade killing and replicate intracellularly. Intracellular survival is thought to be responsible for dissemination of *C. neoformans* from the lung to the brain, causing meningitis. Dendritic cells (DCs) are innate phagocytes that can kill *C. neoformans* in vitro, and these cells are recruited to the lungs during cryptococcal infection. Two subsets of conventional DCs are described in the murine lung: CD11b⁺ and CD103⁺. Based on our data with other innate phagocytes, we hypothesized that pulmonary DC subsets have different interactions with *C. neoformans*. We first purified DC subsets from murine lungs and analyzed DC-cryptococcal interaction. Flow cytometry confirmed interaction of each DC subset with *C. neoformans*. Antifungal assays showed that neither DC subset has antifungal activity in vitro. Further studies will examine cytokines produced by the DC subsets and intracellular morphology following uptake of *C. neoformans* by each DC subset. Also, RNA sequencing will be used to identify genes that are up- or down-regulated in DC subsets following cryptococcal interaction. Understanding mechanisms of DC antifungal activity or fungal immune evasion will provide new therapeutic targets for cryptococcal meningitis.

Modeling the Projected Changes in Distribution of Five Palm Species as a Direct Effect of Changes in their Climate Suitability

Matthew Larson

Abstract

Palms have been used as historical data to indicate an environment's climate in the past. Palms today are expected to be impacted by climate change and few studies have shown how palm trees distribution might shift under different climate scenarios. In this study we used a maximum entropy approach to model the predicted distribution of five species of palm *Sabal minor*, *Sabal etonia*, *Sabal palmetto*, *Rhapidophyllum hystrix*, and *Serenoa repens* under different climate change scenarios. We collected occurrence records for all five of the palm species from the Global Biodiversity Information Facility, New York and Cornell botanical gardens, and Texas herbaria. Using the collected occurrence records, we created a Maxent model for each of the five species by applying 19 different bioclimatic variables at a resolution of 2.5 arc minutes and 11 different general circulation models. Our resulting projected species distributions yielded interesting responses. Many models like *Sabal minor* show a strikingly significant decrease in suitable habitat and a substantial movement northward. Other models like *Rhapidophyllum hystrix* showed little to no change in suitable habitat and distribution.

Natural Explosives: Researching the Native Vine *Cyclanthera Dissecta*, or Squirting Cucumber, for ten Years.

Courtney Johnson & Lisa Castle

Abstract

Students at Southwestern Oklahoma State University have been given the opportunity to engage in fieldwork and data manipulation while working with *Cyclanthera dissecta*, a weedy annual vine that is native to Oklahoma. Despite being related being related to known medicinal and edible plants (e.g. *Cyclanthera pedata*), little is known about this plant with exploding seed pods. The interesting physical characteristics and lack of extensive previous research have made this plant good for student research. Data collection has focused primarily on population size (ranging from 14 to almost 3000 plants in one population) and location of individuals. Students have analyzed the correlation between drought and population decline and are investigating influences of other factors including the timing of first freeze and seed germination on population size.

Behavioral Responses of Adult and Neonate *Sceloporus consobrinus* Lizards to Predatory Odors

Rance Kingfisher & Mark Paulissen

Abstract

Sceloporus lizards are known for their ability to detect conspecific odors; this study will determine whether they can also use their chemosensory abilities to detect the odors of one of their predators: *Masticophis flagellum* (Coachwhip snake). Behaviors such as tongue flicks, cage dancing, tail wiggling, and substrate touches to predatory snake odors left on sheets of filter paper were recorded and compared to behaviors lizards showed to a series of control odors (water, pungent odor, and non-predatory snake odor). The experiment also looked for differences in behavioral reactions to predator odors between adult and neonate lizards. I recorded number of tongue flicks, substrate touches, glass jumps, tail wiggles, time spent cage dancing, time spent in retreat, and amount of time spent on filter paper for all four odor treatments. There were no significant differences in the number of times these behaviors were performed by lizards among the trials. However, adult lizards showed a significantly greater number of odor detection behaviors (tongue flicks and substrate touches) compared to neonates. This study showed that there is no evidence that *Sceloporus* can distinguish the odors of the predatory snake *M. flagellum* from other snakes or water, or if it can, there is no evidence that the lizards reacted differently to these odors versus controls. This study also shows that adult lizards can potentially learn to be vigilant to unknown chemical cues as they grow older.

Phenotypical Analysis of Old and Young Dupuytren's Disease Cells

Gang Xu, Mel Vaughan, & Austin Segrest

Abstract

Dupuytren's Contracture (DC), a buildup of scar tissue in the hand causing digits to flex is treated with surgical removal or enzymes. Contractures have high recurrence rates. Evidence suggests recurrent nodule cells proliferate slower than primary nodule cells; additionally, fibrotic conditions appear to have telomere dysfunction; therefore, short telomeres may play a role in pathologies of recurrent DC. Telomeres shorten when primary cells are cultured. Phenotypic differences of DC cells aged in vitro could be used as a comparison for future in vivo studies. Cells of different population doublings (PD) from a single DC patient (Early/Late PD) were thawed and cultured using standard culture conditions. A scratch wound migration assay was conducted with varying concentrations of platelet derived growth factor (PDGF). A vinculin stain was done to test whether focal adhesion size in presence/absence of TGF- β , contributed to in vitro aging phenotype. Both Early/Late PD cell cultures had PDGF dose-dependent increase in migration. Late PD cells showed lower migration. Early PD cells had more super mature focal adhesions in control conditions than TGF- β ; conditions. Late PD cells had more super mature focal adhesions in TGF- β ; conditions than control conditions. In vitro aging indicated changes from migratory to stationary. Research with other patients' in vitro aged DC cells is ongoing. These studies may provide insights into effects telomere shortening.

Analysis of Proliferation in Phenylalanine, Retinoic Acid, and RA-Inhibitor Treated Cells

Nazka Nurbyek & Michaela Vance

Abstract

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], and growth restriction when a mother with Phenylketonuria [PKU] does not control her intake of Phenylalanine [Phe]. However, the mechanisms responsible for Phe-induced CVMs are poorly understood. Our lab has evidence that high levels of Phe could inhibit Retinoic Acid [RA] signaling, which typically promotes the expression of genes controlling proliferation, migration, and differentiation. Proliferation and migration of the neural crest cells are important in formation of the outflow tract (OFT) and aortic arch arteries (AAA). We hypothesize that Phe inhibits proliferation, which may contribute to the defects seen in MPKU. We also looked at the effects of exposure to RA and a RA inhibitor. We conducted proliferation assays on several cell types including primary cells, and mouse neural crest cells o9-1, to determine the effect of Phe, RA, and a RA inhibitor exposure on proliferation. Images were analyzed with ImageJ and GraphPad Prism. Present research suggests that Phe exposure causes a significant decrease in proliferation of cells. It has been shown that RA increases proliferation, and that RA inhibition decreases proliferation. This could contribute to the CVMs observed in MPKU. This work is significant because it eludes to a potential mechanism that Phe could affect RA signaling, thus resulting in the types of defects observed in human MPKU.

When the Hotline Bling: Angler Choice in Reporting Methods of Tagged Fish

Alexis Peeper & Dr. Andrew Taylor

Abstract

Modern fisheries management is aimed at maximizing human benefit and enjoyment of natural resources, while also working to conserve these resources for future generations. Biologists often tag fish in the wild and rely on angler reports of these tags to glean useful information about migratory behaviors, growth patterns, and fishing pressure. Our objective was to evaluate angler choice among three tag reporting methods and how data quality varied across reporting methods. We tagged 949 black bass (*Micropterus* spp.) in three tributary streams of Lake Tenkiller, Oklahoma, in April and May of 2019. Anglers were presented with three different ways to report: telephone number, email address, and/or uploading records to an iNaturalist project. We explored what methods anglers chose when reporting tagged fish, as well as how data quality varied across reporting methods. For example, we compared how many reports contained an appropriate tag number, the quality of the locality description, and whether or not photographs were included in the report. Results gleaned from this study can be leveraged to increase tag reporting rates and the quality of data resulting from angler reports, advancing fisheries management and conservation efforts.

Nanodiamonds - A Novel Therapy for the Treatment of Pyelonephritis

Mackenzie Bonnewitz

Abstract

Pathogenic microbes are becoming increasingly invasive and resistant to antimicrobials. This is true for strains of *Escherichia coli* (*E. coli*) that are opportunistic pathogens. *E. coli* is the causative agent of more than 85% of urinary tract infections (UTIs). UTIs resulting from invasive *E. coli* strains are often difficult to treat due to recurring infections and increasing rates of antibiotic resistance. Invasive *E. coli* can also ascend to the kidneys from the bladder, resulting in kidney infections called pyelonephritis. Pyelonephritis is more difficult to treat thereby increasing the cost and time of treatment. Thus, it is vital to find novel treatments that can be effective against invasive uropathogens. Nanodiamonds (NDs) are potential candidates that can deliver drugs, like antimicrobials, intracellularly. Due to their small size, biocompatibility, and ability to attach various molecules to their surface, NDs are promising therapeutic agents. In the current study, we determined if NDs can interact with kidney cells by using the human kidney cell line, HK-2, as a model. Cell viability and ability of NDs to bind to HK-2 cells was determined after treating the cells with NDs. Our results indicated that NDs were not cytotoxic to HK-2 cells up to a concentration of 200 $\mu\text{g/mL}$, when incubated for 6 hours. We were also able to detect dose-dependent binding of NDs to HK-2 cells. These findings suggest that NDs may be suitable to deliver drugs intracellularly to kidney cell

From a Cellular Perspective: Can Glycated Chitosan, an Immunoadjuvant, Limit the Deposition of Scar Tissue?

Gang Xu, Mel Vaughan, Khue Tu Doan, & Natthapume Attamakulsri

Abstract

Fibrotic diseases like Dupuytren's contracture (DC) involve excess scar tissue formation. The differentiation of fibroblasts into myofibroblasts plays a main role in DC as it generates contraction in areas without wound openings, leads to the deposition of scar tissue, and eventually flexes one or more fingers. Additionally, DC has a high recurrence rate. Previously we showed glycated chitosan (GC), an immunoadjuvant polysaccharide, inhibited myofibroblast differentiation in a DC fibroblast culture. This experiment aims to determine the specific mechanism of GC on myofibroblast phenotypes and the reorganization of collagen matrices via the scanning electron microscope (SEM). The GC-incorporated and vehicle control (water) stress-relaxed collagen matrices, in vitro 3D models, were used to show the compaction (anchored matrix height reduction) of DC fibroblasts using optical coherence tomography for 12 days. Fibroblasts were unable to compact in GC- and SWNT-GC-collagen matrices to the same extent as vehicle control lattices. Results from immunofluorescent staining showed GC did not inhibit the presence of proliferative myofibroblasts. Therefore, using SEM, different extracellular matrix molecules are investigated as possible mechanisms that affect compaction and contraction in GC-incorporated lattices. This suggests GC may be a potential treatment for the recurrent problem of fibrotic diseases by inhibiting fibroblast compaction and contraction.

Effects of Antimicrobial Compounds in *Spinacia oleracea*

**Yeremuh Rodaind and KJ Abraham,
Department of Biology, Langston University,
Langston, OK.**

Rodaind Yeremuh

Abstract

An antimicrobial compound is an agent that kills microorganisms or inhibits their growth. Studies have shown that some vegetables such as *Spinacia oleracea* (spinach) and *lactuca sativa* (lettuce) consumed by humans contain antimicrobial properties. Recent studies have shown the presence of some phenolic compounds as antimicrobial agents in *S. oleracea*. The objective of this research work was to determine the effects of compounds from spinach leaf extracts on *Escherichia coli*. My hypothesis is that, spinach leaves will show the presence of new compounds with antimicrobial properties. Fresh leaves of spinach were dried and extracted with methanol using the Soxhlet apparatus for approximately 24 hours. Different concentrations of methanol and water fractions were tested for antibacterial activity on *E. coli*. Both fractions indicated the presence of antimicrobial compounds, confirming the hypothesis. Further work is in progress to isolate and identify the compounds in both fractions and attempt to characterize new natural antibiotics.

Inhibition of *Listeria* spp and *Salmonella* spp on Sprouting Mung Bean Using a Cinnamon Oil Nanoemulsion

Hari Kotturi & Kanika Bhargava

Abstract

The objective of this study is to determine the efficacy of cinnamon oil nanoemulsion in inhibiting the growth of the foodborne pathogens *Listeria* and *Salmonella* on mung bean seeds throughout the sprouting process. We hypothesize that Cinnamon oil nanoemulsion will inhibit the growth of *Listeria* and *Salmonella* on mung beans, over the sprouting process, after treating seeds. A 5% cinnamon oil nanoemulsion (CONE) was prepared by 20-minute sonication of natural 100% cinnamon oil with the surfactant Tween 80 and DI water. Seeds were tested for germination following CONE treatment. To test treatment, the seeds were artificially inoculated with a three-strain cocktail of either *L. monocytogenes* or *S. enterica* then soaked in CONE for one minute. The mung bean seeds were watered and allowed to sprout over a 72 hour period. Samples of the sprouts were homogenized using a stomacher and bacterial enumeration was performed at 0, 24, 48, and 72 hours after treatment. Our results indicate that the CONE treated seeds showed a reduction in bacteria over the seeds treated with water control and no negative effect on germination. Following a 0.5% treatment, the seeds inoculated with *S. enterica* showed the most significant reduction immediately following treatment, at 0 hours, with a 0.89 log reduction. The inoculated with *L. monocytogenes* showed the greatest reduction after 24 hours, with a 1.05 log reduction.

PRELIMINARY ASSESSMENT OF THE IMPACT OF VEGETATION AND CLIMATIC FACTORS ON SMALL MAMMAL COMMUNITIES AT SELMAN LIVING LAB

Taylor Gray

Abstract

The purpose of this project is to monitor changes in small mammal populations and communities over multiple generations to determine what factors affect how the populations and communities change over time. In March of 2018, a permanent trapping web was established at the University of Central Oklahoma's Selman Living Lab (SLL). Two additional permanent webs were established in June of 2018. The SLL is located in the gypsum hills of Woodward County in western Oklahoma. Surveys of the 3 webs are conducted for 3 nights, 4 times a year, and include collection of mammalian and vegetation data. Climate data also is obtained for each day of the trip; monthly and yearly climate data also will be assessed. To date, 7 mammalian and vegetation surveys have been conducted. Based on preliminary data, seasonal and habitat trends have been detected in mammalian populations, with the lowest capture numbers occurring in the summer and reaching peak numbers in the spring. The trapping web located on mixed, slightly disturbed habitat has the most diverse community and the most number of captures/recaptures. Preliminary vegetation data shows seasonal and yearly trends. In the future, the animal, climate, and vegetation data will be used to build mathematical models that can be used to determine which factors have the largest impact on population and community persistence. Additionally, changes in the genomic make-up of the populations over time will be assessed.

Development of Fundamental Laboratory Techniques in the Life Science Field

Elijah Woodward

Abstract

Efficient organization of research laboratories enables accurate and reproducible progress in discovery-based sciences. To support this goal, activities included correct construction and documentation of plasmid libraries (growth/purification and mapping), stocking buffers and pouring/running DNA agarose gels. Notebooking techniques involved electronic documentation of procedures and results analysis. For buffers, calculations, procedure, picture details and final storage labeling and location were documented. The normal progress through a scientific laboratory begins with acquiring these hands-on techniques while communication of techniques remain underdeveloped until later in the scientific training. The goal of the project is an overall hands-on laboratory experience with training in all aspects of the sciences

Sexual selection in a changing world: the effects of cultural eutrophication on the mating biology of amphipods

Parker Judkins

Abstract

Humans are altering ecosystems at alarming rates. Cultural eutrophication is increasing in nutrient loading of aquatic systems due to human activities (e.g., fertilizer runoff). We will explore the population-level consequences of how cultural eutrophication affects sexual selection- an evolutionary process that shapes mating characteristics (e.g., deer antlers). We collected freshwater amphipods, small crustaceans, from nine lakes in NW Pennsylvania that vary in total phosphorus. We used a dissecting microscope fitted with a camera to image due to varying sizes of sexual traits caused by human interactions, of a species of amphipod native to NW Pennsylvanian lakes. Sexual traits differ across lakes due to differences in nutrient availability linked to human interactions, possibly caused by fertilizer or pesticide runoff. We collected specimens and measured sexually selected traits- gnathopods and antennae. Mating pairs of amphipods from 9 Pennsylvania lakes, then dissected and took pictures of the specimens. The pictures were of the whole body, head, gnathopods, and antennae. We found that the gnathopods were larger regardless of the size of the male and were less variable among males in lakes with a higher concentrations of phosphorus. Our results showed that human-driven pollution of aquatic systems interactions may weaken the value of sexually selected trait. Leading to the inhibition of accurate sexual selection.

Association of Conflicts of Interest of Public Speakers at Meetings of the Dermatologic and Ophthalmic Drug Advisory Committee and the Ophthalmic Devices Panel of the US Food and Drug Administration

Matt Vassar & Mostafa Khattab

Abstract

The U.S. Food and Drug Administration holds meetings with advisory committees to discuss the approval of devices and drugs. It has recently been called into question whether conflicts of interest may sway a speaker's argument toward approval of a drug or device. Our study investigated the financial conflicts of interest of open public hearing speakers at meetings of the Dermatologic and Ophthalmic Drug Advisory Committee and the Ophthalmic Devices Panel. We searched the transcripts of FDA meetings from February 2009 to October 2017 and identified speaker names, if they were affected by the disease for which the drug or device is indicated, if they were treated with the product, whether the speaker reported any COI, and if the speaker's statement regarding the product was positive, negative, or neutral toward marketing approval. Our results showed that, compared to speakers without a COI, speakers with a COI were significantly more likely to speak positively about the drug/device in question.

Association of Conflicts of Interest of Public Speakers at Meetings of the Dermatologic and Ophthalmic Drug Advisory Committee and the Ophthalmic Devices Panel of the US Food and Drug Administration

Courtney Cook

Abstract

The U.S. Food and Drug Administration holds meetings with advisory committees to discuss the approval of devices and drugs. It has recently been called into question whether conflicts of interest may sway a speaker's argument toward approval of a drug or device. Our study investigated the financial conflicts of interest of open public hearing speakers at meetings of the Dermatologic and Ophthalmic Drug Advisory Committee and the Ophthalmic Devices Panel. We searched the transcripts of FDA meetings from February 2009 to October 2017 and identified speaker names, if they were affected by the disease for which the drug or device is indicated, if they were treated with the product, whether the speaker reported any COI, and if the speaker's statement regarding the product was positive, negative, or neutral toward marketing approval. Our results showed that, compared to speakers without a COI, speakers with a COI were significantly more likely to speak positively about the drug/device in question.

Utilizing Fluorescent *E. coli* to Study Host-Pathogen Interactions

Alissa Eberhard

Abstract

Escherichia coli (*E. coli*) is known to cause diseases in the gastrointestinal tract as well as urinary tract in humans. It is the causative agent for more than 75% of urinary tract infections. The expression of virulence factors like adhesins and fimbriae in pathogenic strains of *E. coli* enable them to colonize host cells effectively. We would like to evaluate if there are differences in the adherence and cellular trafficking patterns of non-pathogenic and pathogenic strains of *E. coli*. In the current study, we have used *E. coli* K12, which is a non-pathogenic strain. This strain can be used as a control while studying mechanisms that are employed by pathogenic strains. To facilitate the tracking of the bacteria, we prepared chemically competent bacteria using the calcium chloride method. The chemically competent bacteria were transformed with a bacterial expression plasmid encoding the green fluorescence protein (GFP) by the heat shock method. The transformation of the plasmid in the bacteria was confirmed by plasmid isolation followed by restriction digestion. We further confirmed the expression of GFP by fluorescence microscopy. We are currently working on creating fluorescent strains of *E. coli* that can cause urinary tract infections. By creating these fluorescent bacteria, we will be able to detect differences in adherence, invasion and trafficking between non-pathogenic and pathogenic strains of *E. coli* in host cells.

Isolation, Purification, Amplification and Characterization of Arthrobacteriophage, LilTroy.

Savannah Pittman

Abstract

Background: *Gordonia terrae* is a gram-positive non-motile, aerobic bacteria. The colonies are beige and grow well on PYCa media at 28° C. Bacteriophages are viruses that infect and kill bacterial cells. In this study bacteriophage we found infects the host *Gordonia terrae* (strain NRLL B-16283. All protocols were obtained from the SEA-PHAGES Phage Discovery Guide. Soil samples were collected from near a creek bed in Nicoma Park, Oklahoma (35.480007 N, 97.321025 W), and incubated with phage buffer. After filtration, the Enriched Isolation method was used to find a plaque on a lawn of *Gordonia terrae* grown on PYCa media. The phage was purified by picking a plaque, diluting it in phage buffer, performing a 10-fold serial dilution and plating with the bacterium. This process was repeated three times to ensure adequate purification. Following amplification to a high-titer lysate, the phage DNA was extracted using the PCI method. The extracted DNA was visualized using gel electrophoresis. LilTroy is a bacteriophage that produces distinct, clear pinhead plaques on the *Gordonia terrae* bacterial lawn. The final lysate collected had a titer of 3.9×10^{13} pfu/mL. More information on LilTroy and its characteristics are available to view on the SEA-PHAGES phage database. The virus has been archived and is currently stored at the University of Central Oklahoma.

Coliphage Diversity Among Strains of E. coli in Central Oklahoma Waterways

Laura Powell & Paul Olson

Abstract

Coliphages are viruses specific to enteric bacteria found in water sources containing fecal matter. The U.S. Federal Water Pollution Act was established in 1948, followed by the Water Quality Act in 1965, to enforce specific environmental standards for freshwater sources. The purpose of this research encompasses the isolation of coliphages specific to different strains of *Escherichia coli* (E. coli). We hypothesize that we should be able to isolate coliphages for a variety of E. coli strains in Oklahoma waterways while demonstrating differences in coliphage density based on the presence of different strains of E. coli. Procedures employed by the U.S. Environmental Protection Agency (EPA Method 1602) were used to establish a basic protocol. E. coli HB101, E. coli B, and E. coli 11775 were grown in tryptic soy broth (TSB) at 37° C for 24 hours prior to being added to collected water samples. Water samples from Lake Overholser and the Oklahoma River were filtered and mixed with 50° C tryptic soy agar containing E. coli. Subsequent agar overlays were made and incubated at 37° C for 48 hours. Detection of circular plaques (i.e. zones of clearing) from the uniform lawn of growing bacterial cells was observed, indicating cellular lysis and ensuring host cell death had occurred. Our preliminary findings suggest we were able to isolate viruses from collected environmental samples and determine the density of coliphages for multiple strains of E. coli in Oklahoma.

Investigation of Behavioral Fever in *Solenopsis invicta*

Joshua Anadu

Abstract

Red imported fire ants, *Solenopsis invicta* (B.) (Hymenoptera: Formicidae), are one of the most ecologically damaging invasive species in North America. Therefore, understanding the colony level responses to pathogens under different temperature regimes is important to model future expansions of *S. invicta* and the potential for pathogen biological control under changing climate conditions. The microsporidia *Kneallhazia solenopsae* has been found to decrease colony growth rate and spread rapidly, which makes it a quality candidate for biological control. However, some insects have been observed increasing bodily temperatures by altering their thermoregulatory behavior to stifle the progression or eliminate pathogens. Due to the knowledge of established thermoregulatory processes in *S. invicta*, it has been hypothesized that infected colonies could exhibit behavioral fever to mitigate the effects of microsporidian infection. To test this, uninfected and infected colony fragments were placed in binary choice chambers, which were identical other than the difference in temperature. Separate binary choice scenarios were run at 26-33°C (warmer) and 21-29°C (cooler). In the warmer scenario, both uninfected and infected colonies favored the cooler 26°C. However, in the cooler scenario, the uninfected ants favored the cooler 21°C, while the infected ants preferred the warmer 29°C.

The Battle of the Sexes: How female condition affects conflict over mate guarding duration in *Hyalella* amphipods

Shayla Miller & Rickey res

Abstract

Sexual conflict, different evolutionary interests between females and males, is common in nature and is expected to shape the evolution of mating traits and affect the productivity of populations. Most research has focused on male “offense” traits with relatively less research on female “defense” traits. We explored how female condition affects conflict over mate guarding duration in a freshwater amphipod species in the genus *Hyalella*. We hypothesized that females in poor condition with high harassment will be exposed to longer mate guarding periods because they are unable to resist male pairing attempts. To manipulate female condition, we varied the amount of spirulina, a high nutrient protein powder, that is included in a female’s diet. Harassment levels were manipulated by exposing females to one (low harassment treatment) or three (high harassment treatment) males. We found that diet had no significant effect on pairing duration, however females receiving the high harassment treatment did experience longer pairing durations compared to the females receiving the low harassment treatment. This research is important to understanding female traits that mediate sexual conflict over pairing duration in amphipod populations.

Miaurora: New Bacteriophage Isolated From Oklahoma Soil

Micah Byrne

Abstract

A bacteriophage is a virus that infects and replicates within a bacterium. Due to the increase in drug-resistant bacteria, more research is being done on using phages for targeting various bacterial pathogens. This research provides valuable information regarding the isolation, characterization, and sequencing of microbacteriophage Miaurora. Miaurora was isolated using *Microbacterium foliorum* as the host. The soil used for isolating phage was collected from the University of Central Oklahoma's campus (35°39'31"N 97°28'25"W). The soil was then enriched with the host bacteria to amplify the virus. The phage was purified and amplified using multiple serial dilutions, spot plating, and webbed plate assays. The purified phage lysate was used for transmission electron microscopy, and its DNA was extracted using PCI method. Illumina technology was used for sequencing phage DNA. We are currently annotating our phage genome using DNA Master. Here we report the isolation and sequencing of the first microbacteriophage from Oklahoma soil. This study will help expand the knowledge of bacteriophages in Oklahoma soil.

Patterns of Litter Accumulation Within Stream Channels and Adjacent Floodplains

Dr. Andrew Taylor, Dr. Matthew Parks, Brock Archer, Dr. Emily Hendryx, & Alfonzo Cole

Abstract

Litter accumulation in local streams negatively impacts both environmental quality and public perception of natural resources. We investigated litter accumulation trends within a stream channel and its floodplain across four small urban stream sites in the Oklahoma City metropolitan area. We identified three stream unit types (riffle, run, pool) within each site.

For each stream unit, we measured litter accumulation across three perpendicular-to-stream transects with five plots spaced at proportional intervals within the stream channel. Additionally, we included a floodplain plot on each stream bank per transect. At the downstream-most transect for each stream unit, visual litter counts were also recorded from bank-full through the opposite floodplain with a rapid visual-transect count. We first present heatmaps of raw litter count and surface area data within sampled sites. We then explore trends in the dataset, focusing on differences between floodplain and in-stream accumulation, and effects of stream meandering on accumulation. Understanding where and how litter accumulates in urban stream settings will contribute to future mitigation efforts, increased public awareness, and altered perceptions of Oklahoma's natural resources.

Glutathione immobilized polycaprolactone nanofiber mesh as a dermal antioxidant delivery mechanism for diabetic patients

Tara Mazroei

Abstract

Abstract: Glutathione (GSH) is anti-inflammatory and antioxidants biomolecules. Polycaprolactone (PCL) nanofibers mesh (NFM) are capable of attaching and releasing of biomolecules for a prolonged period and has potential for use as transdermal drug delivery system. In our earlier study, we have found that the high level of sugar of diabetic male mice was significantly decreased due to daily injection of glutathione. Moreover, the oxidative stress in diabetic male mice lead to depletion of total glutathione level in body organs (pancreas, spleen, epididymus and testis). The objective of this study was to attach GSH with PCL NFM for control release of GSH biomolecules occur from the fiber mesh to a diabetic body for a long period. This study produced PCL NFM using an electrospun technique and tested on mice to evaluate whether it can be used for dermal drag delivery mechanism. This study also dissolved GSH (2.5mg/ml) with phosphate-buffered saline (PBS) and glutaraldehyde (GLU) solution to create GSH-PBS and GSH-GLU complexes. Each complex was soaked with PCL NFM for 24 hours and dried to create PCL+GSH-PBS and PCL+GSH-GLU meshes. . Fiber morphology, degradation, fibroblast cells adhesion, cytotoxicity, and GSH release activities from each mesh was compared. Fibroblast cells adhesion and cytotoxicity tests found excellent biocompatibility of both GSH immobilized PCL mesh and no degradation until 20 days of study period.

Bacterial analysis of Nanofiber bandage with MgO nanoparticles on Staphylococcus aureus

Sadegh Nikfarjam

Abstract

Abstract: : Prolonged antimicrobial and osteoinductive activities of polycaprolactone (PCL) nanofiber membrane (NFM) for biomedical application is possible by tethering the antimicrobial and osteoinductive molecules with PCL NFM. The effect of MgO NP in which tethered with PCL on the antimicrobial activities is not known; leading to the proposed study. The evaluation of the antimicrobial properties of PCL with and without MgO nanoparticles using Staphylococcus aureus is the purpose of this study. 100, 200 and 400mg/ml of MgO nanoparticles were immobilized with PCL in which supported by acrylic molds. : It is demonstrated that Gentamicin have inhibition zones in bacterial cultured (TSA) and turbidity tests show no signs of bacterial growth. PCL-MgON showed no inhibition zones yet no growth under the molds, and no bacterial growth according to the turbidity test which supported in vitro and lead us for further in vivo study.

QUANTIFYING BEAVER DAMAGE TO TREES IN A BOTTOMLAND FOREST AT ARCADIA LAKE, OKLAHOMA

Chad King

Abstract

North American beaver (*Castor canadensis*) are known to be important ecosystem engineers. Beaver target various tree species and are able to change species composition and manipulate the habitat. It is possible that beaver are targeting specific tree species in a bottomland forest in Arcadia Lake, Oklahoma, indicating a preference or bias on tree selection for food or habitat construction. Using three 75 m transects as a sample of the research area, various tree species were analyzed to determine levels of tree damage and tree size. Beaver damage was assessed using a scale from zero-to-five, with zero indicating no damage and five indicating a felled tree as a result of damage. The most common species present were Green Ash (*Fraxinus pennsylvanica*) and Black Willow (*Salix nigra*). With 262 individual trees sampled, Green Ash had a relative density of 64.48% ($n = 170$) and Black Willow had a relative density of 31.68% ($n = 83$). Average tree diameter of damaged trees was 12.59 cm for Green Ash and 25.45 cm for Black Willow. Results indicate Green Ash being targeted more often and more frequently than Black Willow, with a 2.52 average on the beaver damage scale compared to 0.529 for Black Willow. Beaver may be targeting Green Ash instead of Black Willow more often because of the smaller diameter or simply because of a higher relative density. This research will provide a deeper understanding of how the bottomland forest at Arcadia Lake, Oklahoma may change due to beaver activity.

Population dynamics of overstory green ash (*Fraxinus pennsylvanica*) at Arcadia Lake, Edmond, Oklahoma (2016-2019)

Chad King

Abstract

Green ash (*Fraxinus pennsylvanica*) is a common tree species that we find at Arcadia Lake, Edmond, Oklahoma. This species is located within bottomland forest areas of the lake that frequently floods. In 2016, we tagged 385 overstory green ash in order to analyze long-term population dynamics. During fall 2019, we located, remeasured, and assessed survival of 295 tagged green ash. This allowed us to analyze growth, limitation of growth, and estimate demographics of the green ash population. We found that 30 overstory green ash had died since 2016. The smallest green ash diameter was 6.9 mm and largest diameter was 36.9 mm. Average green ash growth from 2016 to 2019 was 4.83 mm. Several factors are likely affecting green ash demographics including an increase in flooding frequency, beaver activity, and wood-boring insects. Life table projections suggest that the overstory green ash population will only survive for the next 40 years due to biotic and abiotic interactions. This rapid turnover in the green ash population suggests a change in the overstory composition of the forest.

HERBIVORE DAMAGE ON ASCLEPIAS

Getsemani Garcia-Perez

Abstract

Several experiments have shown that herbivores affect plant resistance, growth, and survival. In the current study, we focused on milkweed due to the interest in this species in monarch conservation efforts. Plants were selected across three sites that differed in plant water availability. We randomly chose one leaf per plant and collected and pressed the leaf. The position of the leaf collected was recorded based on the leaves remaining on the main stem. Collections occurred towards the end of the season so that herbivore damage would have accumulated from young plant, through flowering, and fruit dehiscence. Collected leaves were scanned and leaf tissue removed estimated by measuring missing leaf tissue, using a digital application, Image J. We tested, using linear regression, the hypothesis that the older leaves, more basal, would have greater damage compared to younger leaves, higher up on the stem. We also took a look at fruit production and were interested to see if that had any effect of herbivory. This project is still in progress, we are currently focusing on species identification to gain a better understanding of herbivore damage.

Vulnerability of Wild-Harvested Food Plants and Fungal Species

Lisa Castle

Abstract

The United Plant Savers' At-Risk Assessment Tool is a tool designed to rank and categorize wild-harvested medicinal plant species based on their vulnerability to being over-harvested. Students in the Southwestern Oklahoma State University Spring 2020 Plant Taxonomy class applied the tool to wild-harvested edible plant species and wild-harvested fungi. One of the objectives of this study was to learn if the same questions that were originally designed to separate wild-harvest medicinal plant species could be applied to edible plants. Similarly, we evaluated the efficacy and applicability of the tool and its component questions to wild-harvested fungal species. We also sought to compare wild-harvested edible plants to wild-harvested medicinal plants to determine if edible plants are appropriately prioritized with regards to conservation. Finally, we hoped to expand students' knowledge of botanical terminology and increase their skills in sorting and synthesizing scientific information from disparate sources.

Is the Genus the Sum of the Species? Comparison of Vulnerability Scores for Different Plant Species in the Same Genus

Lisa Castle

Abstract

Students in the Spring 2020 Plant Taxonomy class at Southwestern Oklahoma State University scored species of *Physalis* (wild tomatillos) and *Trillium* (wake robin) using the United Plant Savers' At-Risk Assessment Tool. Based on questions about plant life history traits, population size and distribution, the effects of harvest on populations and individual plants, and demand, the tool highlights species vulnerable to over-harvest and points out areas of vulnerability. The United Plant Savers, a conservation organization, had previously published a score for “*Trillium*” considered as a genus and has members investigating the vulnerability of “*Physalis*” overall. However, there are many species in each genus and we sought to determine if the scores for congeneric species are different enough to warrant separate rankings. While the scores were different within the genera, we encountered problems accurately scoring different species as both herbal product users and informational databases often refer to a plant by genus or common name rather than species.

Heptadentate tetraazamacrocyclic pyridinophane bearing four pyridine donors

Emily Burgess, Tim Hubin, & Sierra Long

Abstract

Pyridinophanes are amine ligands containing at least one pyridine donor as part of a macrocyclic ring. Pycen is the most well-known pyridinophane and is so named due to its twelve membered ring matching the size and spacing of nitrogen donors found in the ubiquitous 12-membered Cyclen tetraazamacrocyle. Many pendant-arm analogues of Pycen have been published, including some with pendant arm pyridine donors added. However, we believe that our work represents the first Pycen analogue having three pendant arm pyridines. The new pyridinophane contains seven donor atoms, four of which are pyridine nitrogen atoms. We will present the synthesis and characterization of this new pyridinophane and its coordination chemistry with a range of first-row and some second-row transition metal ions. A designed feature of this ligand is its seven nitrogen donors, which allow for the possibility of heptadentate coordination. We will discuss the characterization of our metal ion complexes with special attention to ligand denticity and complex coordination geometry.

Primary amine pendant arm cross-bridged tetraazamacrocycles and their transition metal complexes

Tim Hubin

Abstract

Cross-bridged tetraazamacrocycles form extremely stable transition metal complexes due to their topological constraint and rigidity. These stable complexes can be used in applications where complex stability is desirable, such as oxidation catalysis or biomedical applications. We have previously described a number of mono-pendant armed cross-bridged tetraazamacrocycles where the pendant arm can function to change the electronic properties of the metal complex with respect to the parent ligand, or provide a site for linking of the ligand to other moieties. Such pendant arms have included carboxylate, amide, pyridine, and phenolic donors. This work details our progress in the synthesis of cross-bridged tetraazamacrocycles having a single primary amine pendant arm. Several related routes involving Phthalimide protection/deprotection have been attempted with mixed results. A route involving the reduction of a primary amide has proven to be more reliable and will be detailed. Multiple transition metal complexes of the resulting ligands have been synthesized and their characterization will also be outlined.

Structural and kinetic stability studies of cross-bridged pentaazamacrocycles

Tim Hubin

Abstract

Ethylene cross-bridged tetraazamacrocycles have been known for multiple decades and have two primary attributes in their transition metal complexes that have made them increasingly popular for as ligands to stabilized transition metal ions for applications as diverse as oxidation catalysis and inorganic drug molecules: 1. their topological constraint and rigidity makes their transition metal complexes extremely stable even under harsh conditions, and 2. their folded structures place free coordination sites on their metal ions cis to one another as required for specific catalytic and biological binding events. Our work has recently produced pentaazamacrocyclic analogues of these ligands which we have named cross-bridged pentaazamacrocycles. This presentation will outline the structural and kinetic stability data we have gathered on this new family of topologically constrained macrocyclic ligands. In particular, the crystal structure of a Cu(II) complex will be correlated with its ability to survive under harsh acidic aqueous conditions.

Towards controlling the alkylation of cross-bridged pentaazamacrocycles

Tim Hubin

Abstract

We have recently introduced a new class of topologically constrained ligand called cross-bridged pentaazamacrocycles. We have produced these ligands by two different synthetic paths. One involves regioselectivity of alkylation controlled by condensation of the parent unbridged pentaazamacrocycles with glyoxal to form aminated functional groups that limit alkylation and direct it to preferred nitrogen atoms which are all tertiary amines. The other follows a patent procedure involving tosyl protection, ring skeleton formation via classic Richman-Atkins strategies, and deprotection to form secondary amines. The latter approach allows addition of a range of alkyl groups and/or pendant arms to the cross-bridged pentaazamacrocyclic skeleton. In this presentation, we will describe the two synthetic pathways and their advantages and disadvantages. We will also present our recent attempts at pendant arm addition to this new topologically constrained parent system.

Electronic structure and oxidation catalysis of phenol pendant armed cross-bridged tetraazamacrocycle transition metal complexes

Tim Hubin

Abstract

We have previously presented synthetic pathways to cross-bridged tetraazamacrocycles with a single phenolic pendant arm. The pendant arm was intended to modify the electronic properties of the transition metal complexes formed, with respect to the parent cross-bridged ligand complexes. These complexes can be used as oxidation catalysts, so control of their electronic properties should allow fine tuning of reactivity in this realm. We present a detailed study of the electronic properties of the phenol-bearing complexes in comparison to published cross-bridged ligand complex analogues. Cyclic voltammetry and UV-Visible spectroscopy were used to investigate how the addition of the phenolic pendant arm modified those electronic properties. We also have obtained initial screening data in hydrogen atom abstraction screening reactions for some complexes, which will be correlated with the electronic properties presented.

Can protein crystal growth techniques be applied successfully to intermediate-sized polyamine ligands and their transition metal complexes?

Tim Hubin

Abstract

Our work with tetraazamacrocycles, and their bridged analogues, has led to some larger analogues that have not been successfully crystallized using our usually reliable small-molecule and transition metal complex crystallization methods, such as organic solvent diffusion and evaporation. A current student spent the past summer in a biological lab learning protein and nucleic acid crystallization techniques that are more suited for these larger biological polymers and oligomers. Based on our lack of success with our largest amine ligands and their complexes, we have begun to explore these biopolymer crystallization techniques, such as hanging drop techniques, and the addition of various buffers, salts, and other additives for primarily aqueous solution crystallization attempts. We will report on the techniques we have put into practice in our transition metal azamacrocycle lab and how successful they have been.

Sterically hindered cross-bridged tetraazamacrocycles

Tim Hubin

Abstract

Ethylene cross-bridged tetraazamacrocycles have found particular success in complexes used in catalytic oxidation of organic substrates. Several ligand derivatives have the two unbridged nitrogen atoms alkylated with different substituents, including methyl, benzyl, and ethyl groups. However, more extremely sterically bulky groups have not yet been utilized. The purposes of the proposed sterically bulky substituents are three-fold: (1) To prevent dimerization, allowing the study of monomeric complexes. Previous Mn and Fe work indicates that lack of steric bulk on the non-bridged nitrogens may allow dimers to form, which will alter the chemistry. Both dimers and monomers should be studied, thus the need for steric bulk. (2) In similar systems, bulky tBu groups lengthen and weaken M-N bonds and cause macrocycle twisting to keep the tBu groups far apart. Modification of the electronic properties of the complexes caused by these sterically induced complex deformations may help realize the specific properties needed for catalysis. (3) To encourage dissociation of one or more macrocyclic nitrogen due to steric bulk. These structural changes may lead to electronic and reactivity changes which should be explored. In this project, we have successfully synthesized an isopropyl substituted ethylene cross-bridged cyclen and its transition metal complexes. Synthetic details of the ligand synthesis and selected properties of the resulting metal complexes will be presented.

Modified tetraazamacrocycles as improved CXCR4 antagonists

Tim Hubin

Abstract

CXCR4 chemokine receptors are found on the surface of immune, and other, cells, and together with the specific natural ligand, stromal cell-derived factor-1 α (SDF-1 α , also known as CXCL12), have been revealed to play a role in a number of disease states. Within the last ten years the CXCR4 and CCR5 co-receptors have been revealed as the entry route for HIV into cells, generating interest in a new therapeutic approach to treatment via fusion inhibitor drugs rather than the current preference for reverse transcriptase and protease inhibitors. CXCR4 expression has also been reported in at least 23 different cancers. CXCL12 stimulation of tumor growth, angiogenesis, and metastasis of breast cancer cells has been described. Target organs for breast metastases such as liver, lung, and bone have high levels of CXCL12, triggering the specific migration of breast tumor cells that express the CXCR4 receptor. Due to the wide-ranging potential biomedical applications that might result, our aim is to develop new antagonists for the CXCR4 co-receptor. They are conformationally fixed macrocyclic compounds where the unrestrained equivalent is a known CXCR4 antagonist. The SWOSU-Hull collaboration has produced well over 50 metal complexes of bis-tetraazamacrocyclic ligands for screening as CXCR4 antagonists. The bis-linked complexes are highly efficient antagonists, while single-macrocyclic analogues are much less effective.

Using Bridged Nucleic Acids for Detection of Phosphatidyl 3-Kinase Catalytic Subunit Alpha Mutation

Rachel Hoffmeister & Sung-Kun (Sean) Kim

Abstract

PIK3CA is responsible for producing the catalytic subunit (p110) of the lipid kinase heterodimer phosphoinositide 3-kinase (PIK3 or PI3K). The E545Q mutation, which is due to single nucleotide mutation (c.1633G>C) and found in the highly conserved helical domain of PIK3CA, has been linked to cases of non-small-cell lung carcinoma (NSCLC). Bridged nucleic acids (BNAs) are modified nucleic acid analogs that have the ability to bind DNA with high affinity so that the resulting T_m values are altered. Moreover, the BNA's resistance to nucleases leads to increased stability in vitro and in vivo. We designed several BNA probes to bind more tightly to wild-type DNA than to mutant DNA. Thus, using BNA we observed lower resulting T_m values of samples of DNA containing the mutant sequence than that of the wild-type DNA. The T_m values of the mutant were significantly lower than that of the wild-type. Using BNAs a greater difference between T_m values was observed than that of the control, (e.g., solely DNA used, with no BNAs involved). This method of using BNAs for the detection of PIK3CA mutations was successful and could be utilized for earlier and more accurate diagnosis of NSCLC.

Inhibition of Metallo-beta-lactamase from *Klebsiella pneumoniae* by Hydroxamate Compounds

Destiny Morris & Sung-Kun (Sean) Kim

Abstract

Antibiotic resistance is a growing problem not only for scientists but for consumers worldwide. A very pertinent antibiotic resistance we are faced with is caused by metallo β -lactamases. These enzymes catalyze the hydrolysis of β -lactam antibiotics and have no clinically accepted inhibitor for their resistance. Consequently, it is critical that an inhibitor is discovered so this kind of antibiotic resistance can be treated. This research is concentrated on determining if the hydroxamate functional group is a viable inhibitor for the metallo- β -lactamase, NDM-1 from *Klebsiella pneumoniae*. We found several commercially available compounds containing hydroxamate functional groups and tested their binding interactions using the computer software, AutoDock 4. Then the top three inhibitors will be tested experimentally in the lab to determine if they are acceptable inhibitors.

The Effect of EWG's and EDG's on HOMO-LUMO Gaps of Polycyclic Aromatic Hydrocarbons

Daniel McInnes

Abstract

This study will determine the relationship between the HOMO-LUMO gap in various PAH's and the largest number of disjoint aromatic pi sextets in the compound. The greater the number of sextets, the larger the PAH's HOMO-LUMO gap is expected to be. Unsubstituted PAH's will be compared with those substituted with electron withdrawing groups and electron donating groups with regards to the predicted ionization potential of the molecule.

Development and validation of a High-Performance Liquid Chromatographic Method for the Determination of Metabolomic Biomarkers associated with Type 2 Diabetes

Sanjeewa Gamagedara

Abstract

Quantifications of the biomarkers associated with Type 2 Diabetes (T2D) are important in disease diagnosis and prognosis, identification of responses to the treatments, and to investigate the mechanisms of drug action. In this study, a novel High-performance liquid chromatographic (HPLC) method with diode array detection (DAD) was developed to quantify urinary hippuric acid, phenylalanine, phenylacetylglutamine and creatinine T2D biomarkers. Creatinine was included to account for the renal dilution of urine. The above biomarkers in urine samples were separated in an Agilent Eclipse XDB- C18 column using 6% acetonitrile and 94% 15 mM phosphate buffer (pH= 3.3) as the mobile phase. The detection wavelengths were 210nm and 225 nm. The Snyder's solvent strengths were constructed all four compounds showed the classical reverse phase liquid chromatographic (RPLC) hydrophobic behavior. The developed HPLC method was validated in synthetic urine matrix using analytical method validation parameters such as linearity, accuracy, reproducibility, limits of detection (LOD) and quantitation (LOQ) for accurate quantification. This validated method can potentially be used in a large scale clinical study. The detailed experimental conditions and results will be presented at the conference.

Numerical Modeling and Simulation of a Microfluidic Platform for Enrichment of Low Abundance Proteins

Mohammad Hossan & Sanjeewa Gamagedara

Abstract

Circulating TGF- β ;1 is one of the key regulators of cardiovascular health. The extremely low abundance of circulating TGF- β ;1 in the blood is one of the major challenges in on-chip purification and extraction. This paper reports numerical modeling and simulation of more than 25000 folds concentration gain of TGF- β ;1 in a 2D cascade microchannel using isotachopheresis (ITP). The 4.3 cm long microfluidic channel with 250 times reduction in cross-sectional area from inlet to outlet was used for ITP simulation. The initial cross-sectional area was 1250 micrometer x 100 micrometer and the final cross-sectional area was 50-micrometer x 10 micrometer with 2D step changed. The reduction in the cross-sectional area was used to complement ITP concentration gain. COMSOL Multiphysics 5.2 was used to simulate the separation and concentration of two proteins- TGF- β ;1 and albumin. The model used the Nernst-Planck equations to predict protein stacking and separation in the sample solution. Microchip with 1D and 2D step changed microfluidic channels were also explored using numerical simulations. The initial concentration of TGF- β ;1 and albumin was 1.25 microgram/ml and after ITP concentration, each protein exhibited more than 25000 folds (\sim 33 mg/ml) concentration gain. This is a significant improvement in the protein concentration factor compared to our previous report in an ITP microchip. This study can be utilized to develop an integrated microchip to detect proteins

Evaluating and Isolating Marine Invertebrate Extracts Based on Biological Activity

Michelle Pham & Kendra Brogden

Abstract

Natural products are defined as small molecules isolated from a source found in nature and are useful in applications such as medicine, agriculture and cosmetics. Due to their chemical diversity and biochemical relevance, the identification of bioactive compounds is significant to the pharmaceutical drug pipeline for their potential use towards the development of new medicine. In the ongoing search for new bioactive compounds, it is of great interest to identify those that are cytotoxic to cancer cells. The brine shrimp lethality assay is suitable for the preliminary screening of cytotoxic compounds since the brine shrimp's lethality correlates with the cytotoxicity of human lung and colon cancer cells. The aim of this work is to identify bioactive extracts from the brine shrimp assay, and then isolate and elucidate the structure of the bioactive compound. The evaluated extracts came from the University of Oklahoma Schmitz Sponge collection. With the assay, each extract is screened at a low (10.0 ppm), medium (50.0 ppm), and high concentration (100 ppm). Extracts indicating 70% lethality or higher with any concentration are reinvestigated using a confirmation assay. Of 33 extracts tested, 3 are inactive, 6 are moderately active, and 22 are active. Bioactive extracts are fractionated by chromatographic methods, and then the bioactive compound(s) identified using nuclear magnetic resonance spectroscopy, mass spectrometry and infrared spectroscopy.

The Synthesis and Characterization of [Cr(Py₃Pyclen)(H₂O)] (PF₆)

Emily Burgess & Tim Hubin

Abstract

The synthesis of metal-ligand complexes is still a developing area in inorganic chemistry. The development of a stable, pure metal-ligand complex with a high yield is the synthetic goal. The use of Py₃Pyclen with the aim of a hepta-dentate ligand, is a relatively novel area where an exact working sequence with high purity and yield has not yet been determined. This project focused on the synthesis of Py₃Pyclen, the development of a chromium-ligand complex with the synthesized ligand, and the characterization of the resulting [Cr(Py₃Pyclen)(H₂O)] (PF₆) complex.

Synthesis and Complexation of 15aneN5 using Ni²⁺

Sierra Long & Tim Hubin

Abstract

Metal-ligand synthesis is still an ongoing adventure in the field of chemistry despite being around for ages. While attempts to synthesize organometallic complexes continue, the development of a stable synthetic process is the main goal. The synthesis of stable pentaazamacrocyclic, 15aneN5, and its complexation with metal ions is a new practice in inorganic chemistry and a high yield has not been obtained. The purpose of this project was synthesis of cross-bridged forms of ligand 15aneN5, determining its complexation and the synthesis and complexation of Ni(15aneN5)(OAc)]PF₆.

High Temperature Study of the Reactions of Titanium, Silicon, and Yttrium Oxides.

Lizbeth Robles-Fernandez, Fernando Salazar-Salas, &
Dwight Myers

Abstract

Reactions of titanium oxide and silicon dioxide are of importance in materials used in high temperature environments. The extent of reaction and temperature range are important questions to answer for this chemical system. Presently we are exploring the reaction of titanium dioxide with silicon dioxide and trace amounts of yttrium oxide added. There are questions concerning the reaction of titanium dioxide (rutile) with silica. Both are important as potential materials or reaction products in thermal barrier coatings or environmental barrier coatings in combustion environments, as for example in gas turbine technologies. Experimental evidence would suggest that a third cation is necessary to have compound formation. Mixtures of the three oxides are being subjected to heatings at various temperatures from ca. 1200-1500°C. Samples are characterized before and after heating by means of X-ray diffraction and diffuse reflectance infrared spectroscopy, transmission infrared spectroscopy, and/or diffuse reflectance, UV/Vis spectroscopy as appropriate. Recent findings have shown that continual heatings and increased amounts of the Yttrium oxide are yielding further interactions between the three compounds. The ternary compound has not been seen. Results to date will be presented.

Stabilization of Metallo- β -lactamase using Ionic Liquids

Sung-Kun (Sean) Kim & Deanna Collins

Abstract

Metallo- β -lactamase from *Bacillus anthracis* (Bla 2) catalyzes the hydrolysis of β -lactam ring structure of the β -lactam antibiotics. This results in the inactivation of β -lactam antibiotics such as penicillin and cephalosporin. To study this enzyme, long-term storage would be beneficial to future research. Ionic liquids have been thought to be protein stabilizers. Thus, we probed the possibility of stabilizing bla 2 using imidazolium containing ionic liquids, which are suggested to be stabilizers. Turbidity and enzyme activity tests were performed using Uv-vis spectrophotometry. Turbidity tests at 600 nm indicated that the enzyme was stable whereas enzyme activity tests showed the enzyme was denatured after 15 minutes. The tests at room temperature showed a slight decrease in activity which can be explained by computer analysis. The imidazolium merely bound to the active site of Bla 2 causing the enzyme to become slightly denatured. Imidazolium containing ionic liquids could not be used as a stabilizer of Bla 2, however it may be an inhibitor.

Inhibition of New Delhi metallo-beta-lactamase by hydroxyl(thio)pyrone and hydroxyl(thio)pyridinone compounds

Sung-Kun (Sean) Kim, Ahmed Alkhalifah, & Andrew Huckleby

Abstract

Bacteria has developed naturally to resist antibiotics and this is a major threat for human health. New Delhi metallo-beta-lactamase 1 (NDM-1) is an enzyme that makes bacteria resistant to a broad range of beta-lactam antibiotics. Currently there is no inhibitor of NDM-1 available in clinical therapy, thus making an essential need for research and development of a NDM-1 inhibitor. In this research we collected data using AutoDock to estimate the binding affinity of four potential molecule inhibitors. The molecules were Maltol, Thiomaltol, DMHP, and DMHTP which act as ligands to inhibit the NDM-1 enzyme by binding to the active site and blocking the catalytic enzyme activity and killing the bacteria.

A Molecular Dynamic Study of TAR DNA binding protein 43 Diagnostic Peptides

Sung-Kun (Sean) Kim

Abstract

In human cells, the TAR DNA binding protein, TDP-43, serves multiple functions with regulation of gene expression and mRNA splicing being the primary. An abundant amount of research has linked this protein to neuronal-degeneration in cases of Amyotrophic Lateral Sclerosis (ALS) and Frontotemporal Lobar Degeneration (FTLD), due to its tendency to form stress-induced inclusions. Using a study in which phage display technology was used to select for two peptides that were shown to have a high binding affinity for TDP-43, we performed a computational docking and molecular dynamics simulation to identify theoretical binding sites on the TDP-43 protein that were favored by the two peptides. These results coupled with the experimental data suggests that these peptides function as an effective biomarker in TDP-43 detection.

Theoretical Study of Chlorine Atom Complexation by Chloro-Substituted Methanes: Benchmark Energies and Performance of DFT Methods.

William Kelly

Abstract

Experimental evidence demonstrates that chlorinated solvents CH_2Cl_2 , CHCl_3 and CCl_4 form stable $\text{Cl} \cdot$ solvent complexes during free radical photochlorination reactions. Recent ab initio computations identified stable $\text{Cl} \cdot \text{CH}_2\text{Cl}_2$ and $\text{Cl} \cdot \text{CHCl}_3$ complexes with binding energies determined at the G3 composite method of -3.3 and -6.6 kJ mol⁻¹, respectively. Both complexes have Cs symmetry. A DFT study at M062X/aug-cc-pVTZ model chemistry found a stable $\text{Cl} \cdot \text{CHCl}_3$ complex of C1 symmetry with a binding energy of -16 kJ mol⁻¹. We probed the potential energy surfaces for Cl atom complexation with CH_2Cl_2 and CHCl_3 employing several recent DFT methods (M062X, M11, WB97X, WB97X-D, B2PLYP, B2PLYPD and B2PLYPD3) and MP2 employing aug-cc-pVXZ (X=2-4). Two Cl atom complex geometries of Cs and C1 symmetry were obtained for each of the chlorinated solvents. Optimizations were carried out both with/without counterpoise corrections. The effect of basis set superposition error (BSSE) on both the potential energy surface and energy was negligible with the aug-cc-pVQZ basis set. Complex stabilization energies were obtained using the supermolecule approach and all electronic energies were corrected by addition of scaled zero point vibrational energies. DFT methods gave stabilization energies for the two complexes obtained for Cl atom interaction with CH_2Cl_2 ranging from -14.7 to -18.2 kJ mol⁻¹, whereas stabilization energies for the two complexes obtained from CHCl_3 ranged from -1

Development of a Microfluidic Device Integrating Solid-Phase Extraction and Microchip Electrophoresis

Mohammad Hossan & Sanjeewa Gamagedara

Abstract

Microfluidic devices became popular clinical sample analysis due to small sample size, portability, low cost of fabrication, shorter analysis time and mass productions. In this project, we concentrated on integrating a solid phase extraction (SPE) channel to a microfluidic device. The SPE will help to purify the samples and to preconcentrate the analytes. For this device, PDMS (Polydimethylsiloxane) was used to minimize the cost of fabrication because it is cheaper than the commonly used PMMA (Polymethyl methacrylate) and SU-8. The photolithographic method was used for the fabrication of microfluidic devices using PDMS. The Oasis Hydrophilic-Lipophilic-Balance SPE particles were placed on a segment of the channel for the sample purification and preconcentration. Initially, the particles were carried out during the insertion of the water, but this problem was solved using the small piece of a fritted disk as the barrier on both sides of the segment where the particles were placed. The channel was tested using a syringe pump infusion at a rate of 50 μ L/ min with 5mL water in the syringe. Further experiments need to be done to have a properly sealed SPE integrated microfluidic device.

Inhibition of Hexokinase II by Fenbendazole

Sung-Kun (Sean) Kim & Hillary Le

Abstract

Fenbendazole (methyl N-(6-phenylsulfanyl-1H-benzimidazol-2-yl) carbamate) (FZ) is a broad spectrum benzimidazole anthelmintic that may disrupt cellular growth in cancer cells by depolymerizing microtubules. FZ may reduce glucose uptake from GLUT4 transporters and expression of glycolytic enzymes, like Hexokinase II. Here, we attempted to identify the binding location of Fenbendazole onto Hexokinase II. The chemical structure of FZ and Hexokinase II was illustrated using cheminformatics and bioinformatics software. We used molecular modeling simulation to find protein-ligand docking to bind the macromolecule with the ligand. The Autogrid parameter file used to pre-calculate maps of the energetics of the specific ligand configuration. This gave us a detailed view of energies and clusters that displayed exact binding site of Hexokinase II to Fenbendazole. In silico studies showed that FZ had altered the microtubule network at the binding site Asparagine D209. Results showed that FZ had 10 dockings with a range of docking energy of -5.5 to 6.75. Identifying the exact location of FZ binding to Hexokinase can have a lot of future implications in its research and possible therapeutic use.

Study of iodine distribution and concentrations in western Oklahoma brine waters

Jason Wickham & Ben Baker

Abstract

In the late 1970's, it was discovered that the brine waters of NW OK contain significant amounts of Iodine (above 60 ppm). However, the exact amounts and distributions of Iodine throughout this region were unknown. Currently, the majority of the world's supply of Iodine comes from mining Iodate minerals in Chile ($\approx 65\%$), brine water aquifers in NW Oklahoma ($\approx 5\%$) and Japan ($\approx 25\%$), and seaweed extraction. With the growing need for Iodine compounds in various fields the demand for Iodine is higher than ever. Thus, Iofina has recruited the aid of NWOSU to quantify the Iodine concentrations and distribution throughout the brine aquifer, as well as, determine the longevity of these iodine concentrations. So far, this study has led to the discovery of new sites within the aquifer that may be of commercial interest and has taken an in-depth look at several possible new plant sites, with one of these sites being built and beginning operation during February 2018 and another currently under construction. Fluctuations in iodine concentrations of up to 100 ppm have been observed throughout this study which is a much larger fluctuation than the expected 10 ppm. We are currently investigating rather these fluctuations are due to the changed from vertical to horizontal wells as a function of the inhomogeneity within the brine aquifer.

A Closer Look At The Chemical Effects Nicotine Has On The Brain

Abul Kasem Rahman

Abstract

Presenting Author : Rahool Barua, Faculty Adviser : A.K.Fazlur Rahman, Ph.D.

Abstract :

Nicotine comes from the tobacco plant and is a stimulant for neural receptors in the nervous system. This stimulation is mediated using several neurotransmitters, such as acetylcholine, serotine, dopamine, etc. The release of dopamine due to stimulation has been cited as the source of addiction and depression due to this neurotransmitter being responsible for happiness. The research done aims to prove the isolation of nicotine in smoking systems such as e-cigarettes and vapes have increased nicotine's addictive properties and has made it more harmful for consumption.

Computational Studies of Structure and Reactivity of Selected Carbenes

Brandon Blankenship & Charles Crittell

Abstract

Carbenes are highly reactive species containing neutral divalent carbon. Carbenes also contain two nonbonding electrons on the carbon center that are either paired, singlet or are unpaired, triplet. While there are some carbenes that are persistent, the overwhelming majority are short lived and can not be studied directly. The goal of this project is to investigate the nature of several short lived carbenes using theoretical studies. The geometry and relative energy levels of both singlet and triplet carbenes will be explored.

Measuring Thermal Denaturation of Heme Binding Proteins by Differential Scanning Calorimetry

Kyle Moore

Abstract

Protein folding and unfolding is often modeled as an equilibrium between two extreme states, folded and unfolded. Differential Scanning Calorimetry (DSC) is a method by which heat flow between two samples is measured as a function of temperature increasing or decreasing. Proteins thermally denature, and thus transition between folded and unfolded, at a specific temperature known as the melting temperature (T_M). A DSC can measure protein unfolding by monitoring the difference in the heat flow between a protein sample dissolved in a buffer and a reference buffer. Heme binding proteins in pathogenic organisms like *Listeria monocytogenes* are virulence factors when causing infections. In order to investigate the thermal stability of these proteins, we tested two heme binding proteins from *L. monocytogenes* using a DSC-25. Here we report the change in enthalpy and change in entropy for the thermal denaturation of Hbp1 and Hbp2.

Advances Towards the Utilization of Cucurbit[n]uril and Selected Guests in Molecular Machines and Devices.

Usha Khadka

Abstract

Supramolecular chemistry has found useful application in chemistry, with cucurbit[n]urils (CB[n]) exhibiting unique chemical properties. By the use of primarily hydrophobic interactions, these macrocycles can bind various small molecules with high binding constants in the range of 10^6 to 10^{12} M⁻¹. The potential applications of these host guest systems can include molecular machines, drug delivery, and the purification of water. Our work focused on the synthesis of different viologens and alkynes; and their binding modes were studied by ¹H NMR chemical shift data and binding constants by ¹H NMR competition with CB[7] and CB[8], which could lead us to strategic incorporation of these molecules into molecular machines and devices. Different mono and di-substituted compounds were synthesized from starting material 4,4-dipyridine and 1,7-octadiyne with varied substituents like methyl, hexyl and 1-ethoxy-2-(2-methoxyethoxy)- groups. These structures have been chosen for their potential for building more complex host-guest systems through organic synthesis.

Isolating Bioactive Compounds from Marine Invertebrates

Michelle Pham & Kendra Brogden

Abstract

Due to natural products' chemical diversity and biochemical relevance, the identification of bioactive compounds is of great interest to the pharmaceutical industry for their potential use towards the development of new medicines especially cancer treatments. The brine shrimp (*Artemia* spp.) lethality assay is an appropriate preliminary screening of cytotoxic compounds since the brine shrimp's lethality correlates to the cytotoxicity of human cancer cells from the lung and colon lining. The aim of this work was to isolate and identify cytotoxic bioactive compounds for their potential use in pharmaceutical use by fractionating active marine invertebrate extracts. The evaluated extracts were obtained from the University of Oklahoma Schmitz Sponge collection. Each extract was screened utilizing the brine shrimp assay at a low, medium, and high concentration (333 ppm, 1667 ppm, and 3333 ppm). Extracts indicating 70% lethality were considered active and fractioned by normal and reverse phase flash chromatography. The activity was followed in successive brine shrimp lethality assays. Bioactive fractions will be analyzed using nuclear magnetic resonance (NMR) spectroscopy, mass spectrometry, and infrared (IR) spectroscopy to elucidate the structure of the bioactive compound(s) as time allows.

Computational Determination of the Enthalpy of Formation Aluminum Hydroxide Vapor

Dwight Myers & Uendi Pustina

Abstract

Reactivity and compatibility of oxides with other materials and with each other plays a significant role in choice of materials for developing Thermal Barrier Coatings (TBCs) or Environmental Barrier Coatings (EBCs) for use in combustion environments. Aluminum oxide is one material with potential for these applications. However, the oxide coating itself can be eroded away by reaction with hot water vapor in a combustion environment, forming volatile hydroxides. Aluminum oxide can react with water vapor to form a volatile aluminum hydroxide. We are performing a computational study of the gas phase molecule aluminum hydroxide. The ultimate goal of this study is to obtain a reliable value of the enthalpy of formation of aluminum hydroxide. The software we are using is the GAMESS ab initio package. To determine the enthalpy of formation of the aluminum hydroxide molecule, the enthalpy of reaction of the isodesmic, isogyric reaction of aluminum fluoride vapor with water vapor to yield aluminum hydroxide and hydrogen fluoride will be studied. Results at the G3-MP2 level will be compared to higher level computations using the CCSD(T) level of theory. Comparison will be made to other computational results for the aluminum hydroxide vapor species.

Microwave Synthesis of Imidazoles from 1,2-diketones

Peyton Little & Elizabeth Nalley

Abstract

Allowing many chemical reactions to be completed within minutes, microwave technology has revolutionized preparative chemistry. Since it is a green technology, it is becoming widely adopted in both academic and industrial laboratories. Heterocycles are very important functional groups especially in medicinal chemistry. In this research heterocyclic precursors of pharmaceuticals are synthesized using microwave radiation. In this poster we describe the synthesis of a number of 2,4,5-trisubstituted imidazoles from 1,2-diketones and substituted benzaldehydes in the presence of NH_4OAc . The imidazoles are purified and characterized using FTIR and NMR. These imidazoles will be tested as possible catalysts in microwave synthesis of esters.

Applications of Magnetite-Glutathionine Based Catalysts in Organic Syntheses

Restituto Paris & Stephen Myers

Abstract

During the past year we have employed microwave radiation and sonication to synthesize a number of heterocyclics which are precursors of a number of medicinal compounds. Both the microwave synthesis and sonichemistry reactions enable us to study the applications of unique catalysts in organic synthesis of these heterocyclics. The synthesis of well-defined nanomaterials and nanocatalysts is an integral part of nanotechnology and catalysis science, because it is imperative to control their size, shape, and compositional engineering for unique deployment in the field of nanocatalysis and organic synthesis. Sustainable nanomaterials and their applications in benign media are an ideal blend for the development of greener methodologies in organic synthesis; MW heating provides superb value to the overall sustainable process development via process intensification. In this study we have synthesized a number of magnetite catalysts using sonication to bond Glutathionine to Magnetite and then bonding the Glutathionine magnetite complex to various transition metals. These catalysts were tested as microwave catalysts in a number of organic syntheses.

Green one-step, one-pot route to cyclic carbonates from soybean, sunflower and corn oils for the synthesis of polyurethanes

Theresa Hinkle

Abstract

As recent literature indicates, microwaves are quickly becoming an accepted tool for investigators in the organic laboratory. Microwave synthesis enables reactions to proceed more rapidly with greater yields than many conventional techniques. In parallel, there is a growing concern about the isocyanate chemistry used to produce polyurethanes. Indeed, isocyanates are known to be toxic and are synthesized from phosgene, an even more toxic gas. An alternative route to the isocyanate/alcohol chemistry is the cyclic carbonate aminolysis. However, the conventional synthesis of cyclic carbonate requires a two-step procedure: epoxidation of double bond followed by carbonation.

In this research, we investigated the use of microwaves to synthesize cyclic carbonate from natural products such as soybean, sunflower and corn oils in one-pot, one-step reaction. These monomers can then be converted to polymers, which are produced using derivatized “natural products”. We will compare the efficiency of microwave/conventional synthesis of polymers.

Thermal Degredation of Polystyrene in Lewis Acid Solutions

Alexander Chandler

Abstract

The goal of this project is to determine the effects of Lewis acids in the degradation process of polystyrene, the main component of “styrofoam”. Stock solutions of 0.02 M of the Lewis acids and were prepared in DMF. 0.002 g of polystyrene was dissolved in both the lewis acid stock solutions at room temperature. Additionally, these stock solutions were heated to 80 °C. Temperature, as well as the addition of lewis acids, played a major role in the time it takes for the degradation of the polystyrene. Preliminary results have demonstrated a clear link between temperature and the time it takes for the polystyrene to degrade. Further investigations are planned in identifying the products of this degradation, since many are toxic, to optimize degradation while minimizing toxic byproducts. These insights may help provide a viable for disposing of polystyrene wastes.

The Importance of Anti-Psychotics in Mental Health Treatment

Abul Kasem Rahman & Ilana Rozzell

Abstract

Author : Ilana Rozzell, Oklahoma School of Science and Mathematics

Faculty Advisor : A.K.Fazlur Rahman, Chemistry Department

Abstract :

Antipsychotics are a group of extremely vital medications for the improvement of mental health. Both 1st generation and second generation antipsychotic medications are designed to reduce and prevent the return of psychotic symptoms, including hallucinations, delusions and disordered thinking. Modern medications for treating psychosis are known as ‘second-generation’ or ‘atypical’ antipsychotics. In this paper we will investigate the various antipsychotics available in the market. Our main focus will be to understand how these medications function in reducing or eliminating symptoms of psychosis that otherwise can disable a person. We will also describe how antipsychotics work to block dopamine receptors that are thought to be the cause of the psychosis to begin with. A noteworthy example, may include that usage of Thorazine which is believed to block dopamine in the treatment of schizophrenia and manic-depression.

Dihydrodipicolate Synthase and Natural Product Inhibitors

Nathan Blythe

Abstract

Lysine is an essential amino acid used in the biosynthesis of proteins. Two main biosynthetic pathways, the diaminopimelate (DAP) pathway and the α -aminoadipate pathway (AAA) synthesize lysine. The targeted pathway of this research is the DAP pathway. Dihydrodipicolinate synthase (DHDPS) is catalyzing condensation reaction of pyruvate and aspartate semialdehyde to form dihydropicolinate. The enzyme is at the committed step of the DAP pathway making it a key target for drug design. Several samples from the National Cancer Institute (NCI) Repository are being investigated for inhibition of the DHDPS. The samples are analyzed with thin-layered chromatography to find the best solvent system. Samples are then analyzed and fractioned using reverse phase and normal phase flash chromatography for partial purification using the High Performance Flash Chromatography system Isolera (Biotage). Active fractions for inhibition of DHDPS are then tested using enzyme kinetic studies.

Photophysical Properties of Fluorescent Texas Red Dyes in Confined Environments

Dr. Rajesh Nayak

Abstract

The photophysical properties of fluorescent Texas red dyes have been investigated in confined reverse micellar environments. The anionic surfactant sodium bis (2-ethylhexyl) sulfosuccinate, also known as Aeresol-OT or AOT and the cationic surfactant Cetyl trimethylammonium bromide, commonly known as CTAB have been used as reverse micelles in these studies. Various steady-state and time-resolved spectroscopic techniques such as UV-Vis absorption, fluorescence emission, Fluorescence Anisotropy, Dynamic Light scattering (DLS) as well as Time Correlated Single Photon Counting (TCSPC) techniques were employed to understand the behavior of the dyes in reverse micelles. The results obtained in confined environments were compared with the results in aqueous environments. Our experimental observation shows that the electronic and hydrodynamic properties of the probe molecules inside crowded reverse micelles can be different as compared to those in aqueous environments. Our present studies have the enormous potential to use fluorescent probe molecules as biomolecule labels and reverse micelle as simple model systems to probe biomolecule dynamics in reverse micelle environment which mimic the crowded biological cell.

Synthesis and Surface Functionalization of Dye Doped Silica Nanoparticles

Tarell Nunley

Abstract

Silica nanoparticles (SiNPs) are highly sought after nanomaterials due to the many applications they offer such as biomarkers, additives in nanocomposites, and optical sensing devices. SiNPs can be synthesized and functionalized through numerous pathways, making them the ideal building block for nano-scale assemblies or nanocomposites. Additionally, their optical transparency allows SiNPS to be applied in nano-scale sensing devices or meta-materials that respond to electromagnetic radiation. Here, we describe the synthesis and surface functionalization of dye-doped SiNPs. The particles were assembled via a modified Stöber method using an aqueous-organic bilayer system. The particles were regrown iteratively to create a core shell motif that allows for further functionalization such as dye incorporation where the dye is trapped in the matrix of silica through an additional layer grown on the surface. The second layer of silica also provides a surface for functionalization, including amine functional groups, providing a pathway for use in an nano-assembly. These dye-doped surface functionalized SiNPs are intended to be used as dye trapping agents in an energy transfer nano-scale assembly with gold nanorods (GNR) with potential contributions to industries such as biomarkers in the medical field to nanocomposites in the aerospace industry. This work addresses the techniques used to synthesize multilayer fluorescent dye dope SiNP with anime surface functionalization.

Biologically Important Compounds: Synthesis and Antitumor Studies of Nicotinic Acid, Thionicotinic Acid, Pryrimidine thiolate and Methionine Complexes of Platinum

Abul Kasem Rahman & Vickie Jean

Abstract

A.K.Fazlur Rahman¹, Edwin Ding, Alex Lin, Kevin Thomas, Pedro Lozano-DeAos¹, Prabir Chakraborty², Pryabratta Mukherjee ²

1. Department of Chemistry, Oklahoma School of Science and mathematics

2. University of Oklahoma Health Science Center, Oklahoma City, OK

Abstract:

In our continuing effort to develop and study anticancer active platinum compounds we have synthesized a series of platinum compounds coordinated to pyridine thiol (I), tetrahydropyrimidine thiol (II) and Amino acids. Some structural features including biological studies will be discussed during the presentation. Preliminary data suggests that some of these compounds have potential antitumor activity. We have screened the efficacy of the synthesized compounds on ovarian cancer (OC) cell lines. Ovarian cancer accounts for high mortality in American women and is attributed to acquired chemoresistance and unavailability of specific targeted therapy. From our initial screen we have identified two compounds showing bolstered cancer cell killing through induction of apoptosis. In conclusion, these compounds hold promise for better therapeutic outcomes in cancer, including OC.

Ab initio calculations of C-C bond activation via protonation or electrophilic methylation in metal complexes

Abul Kasem Rahman

Abstract

A.K. Fazlur Rahman¹, Alex Lin¹, Bin Wang²

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Abstract:

In this study, the reaction profile of metal complexes in the form of $M(\eta^5\text{-}(\text{C}_5\text{H}_5)(\eta^4\text{-bicyclo [2.2.1]-hepta-2,5-diene}))$ was investigated using ab initio density functional theory (DFT) calculations. The calculations were performed following a known reaction route with $\text{Co}(\eta^5\text{-C}_5\text{H}_5)(\eta^4\text{-bicyclo[2.2.1]-hepta-2,5-diene})$ involving the protonation and activation of a carbon-carbon bond in the 2,5-norbornadiene via agostic M-H-C interactions. Then, the same computational method was used to study the analogous electrophilic methylation of $\text{Co}(\eta^5\text{-}(\text{C}_5\text{H}_5)(\eta^4\text{-bicyclo[2.2.1]-hepta-2,5-diene}))$ following a similar reaction mechanism. Additionally, the protonation and electrophilic methylations of analogous metal complexes with central metal Rh and Ir were compared to the Co case. We find that the reaction profiles of both protonation and electrophilic methylation are determined by the type of the transition metal, which thus explains some experimental observations.

Probing Reverse Micelle Environment with Cyanine Dyes using Various Spectroscopic Techniques

Dr. Rajesh Nayak

Abstract

The spectroscopic properties of cyanine dye Cy-5 within water-in-isooctane sodium bis (2-ethyl hexyl) sulfosuccinate (AOT) reverse micellar environment have been investigated as a function of water contents ($W_0=[H_2O]/[AOT]=1-30$) in AOT by using steady-state UV-Vis absorption and emission and time-resolved fluorescence as well as Dynamic Light Scattering (DLS) techniques. Our result shows that the Cy-5 dye inside the smallest reverse micelle ($W_0 = 1$) environment behaves strangely as compared to bigger reverse micelle sizes. This present investigation shows that the Cy-5 dye probably undergoes aggregation inside the smallest reverse micelle. Furthermore, the spectroscopic properties of the Cy-5 inside micelles were compared with the Cy-5 inside aqueous environment and it was found that the dye behaves differently inside the reverse micelle as compared to the aqueous environment. Further optical spectroscopic and 2D NMR experiments are required to understand the location, electronic and hydrodynamic properties of the dyes.

Preparation and reactions of some novel Phosphorus and Nitrogen heterocyclic compounds

David Esjornson

Abstract

Both phosphorus and nitrogen containing compounds have been used to synthesize a variety of metal complexes. Often the phosphorous atom dominates the coordination of these mixed ligands with metals. The synthesis of nitrogen heterocycles where one or two of the nitrogen atoms has been replaced by phosphorus atoms has been attempted. Some new mixed P,N ligands have been synthesized from Cyclohexylphosphine, Formaldehyde and Aniline. Both a pendant nitrogen compound, $\text{CyP}(\text{CH}_2\text{NPh})_2$ (where $\text{Cy} = \text{C}_6\text{H}_{11}$ and $\text{Ph} = \text{C}_6\text{H}_5$), and a heterocyclic six membered ring compound, 5-Cyclohexyl-1,3-diphenyl-1,3,5-diazaphosphinane, have been characterized. This compound has been reacted with a series of Metal(II) complexes, including Manganese, Iron, Cobalt, Nickel, Copper, and Zinc.

Developing a Green Experiment for an Organic Chemistry Laboratory Course

Hugo Sanchez

Abstract

Oxidation reactions are important because they are sources of energy, both natural and artificial. Unfortunately, many oxidation reactions utilize reagents that are harmful to the environment and may impose safety hazards to the person using them. Such chemical compounds like chromic acid and potassium permanganate pose these kinds of hazards, and as such should be used with the utmost care when handling them in the lab. Green chemistry is an area of chemistry that seeks to prevent the use of harmful chemicals, reduce waste, and prevent harm to human health and the environment. The purpose of this project is to produce a green lab experiment by the conversion of cyclohexanol to cyclohexanone via an oxidation reaction with sodium hypochlorite (bleach) and glacial acetic acid. The goal is to develop a green synthesis that can be purified in good yield and can be analyzed the next day. There have been research articles citing the successful oxidation of cyclohexanol to cyclohexanone, but this work needs to be heavily modified to succeed in a teaching laboratory setting. The current goal of this project is to implement this experiment into a study for undergraduate students who are taking Organic Chemistry II. The final products must be reproduced in good yield and in a timely manner all while analyzing the results using NMR and IR. The study involving undergrads must be taken into utmost consideration which involves getting proper ethical training and IRB approval.

Synthesis, Transport and Recovery of aluminum oxide nanoparticles through limestone and dolomite rock.

Randall Maples

Abstract

Nanomaterials such as metal oxides are finding greater use in industry, for applications such as materials coatings, sensors and even drug delivery. Because of this, there is the increased potential of engineered nanoparticle release into the environment as contaminants when devices and materials containing these are disposed of. It is important to assess the short and long-term fate of these engineered materials and their distribution in groundwater and subsurface. This study looked at the synthesis, characterization, transport and recovery of water dispersible functionalized aluminum oxide nanoparticles through packed stone columns as models for the local groundwater environment in central Oklahoma.

Iron-binding Compound Production in Marine Microorganisms

Jessica Martin, Patrick Huling, & Kyle Brown

Abstract

Iron is the fourth most abundant element on the earth's surface, yet it is only sparingly soluble in the aerobic, near neutral conditions under which most microbes grow. Hence 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 binding compounds called siderophores to compete for iron. Microbes are thought to produce unique siderophore structures to successfully compete for iron against other organisms in their environment. We studied the production of a siderophore by *Halomonas cupida* ATCC 35135 using low-iron competitive growth environments. Results conclude that *Halomonas cupida* ATCC 35135 does produce a siderophore. Current studies are on identifying siderophore structure.

The production of siderophores and the methods of testing for new siderophores

Sierra Hinkle & Jessica Martin

Abstract

Iron is a fundamental nutrient in not only human life but also microbial life. While iron is controlled through diet for mammals, microbes have to find other ways to obtain the iron they need for survival. They do so by using siderophores. Siderophores are ferric iron chelating agents, which are typically low in molecular weight. Their job is to seize iron from the environment and make it available to the cell to promote cell growth and survival. This is a necessary process due to the poor solubility of iron in the aerobic conditions in which many microbes cultivate. We report here the production of siderophores by *H. pacifica* and *S. salmonicolor* and the methods of testing these compounds for new siderophores.

Siderophore Production and Competition Between Fungi

Jessica Martin & Kylie Whitlock

Abstract

Siderophores are significant to the cellular functions of microorganisms. Microbes produce siderophores to facilitate bringing iron from the environment into the cell. Siderophores are chelating agents which have a high affinity for binding with ferric iron. Without siderophores, microbes would have difficulties competing for iron in certain environments such as the aerobic conditions of marine life. Due to other microorganisms also competing for iron in the same environment, microbes produce siderophores that differ in structure. A look into the competition between fungi and the siderophores they produce can give insight on the importance of siderophore production in microbes. We report here on the production of siderophores by *Cunninghamella elegans* and *Sporidiobolus salmonicolor* grown individually as well as the production of siderophores when they are grown together.

Graphene: Its Mass Production and Potential Impact

Lunea Wang & Abul Kasem Rahman

Abstract

Presenting Author : Lunea Wang, Oklahoma School of Science and Mathematics

Abstract

At only one atom thick, graphene, an allotrope of carbon with a hexagonal lattice, has many properties that could lead to significant advancements in fields of engineering, technology, and medicine. After first being isolated from bulk graphite in 2004, it has been discovered that graphene is flexible, durable, transparent, biocompatible, as well as a superconductor of both heat and electricity while also being one of the strongest materials known to man. Traditionally, graphene had been expensive and difficult to make on an industrial scale, hence graphene's potential has remained largely untapped outside of laboratory research. However, researchers recently developed methods to mass produce graphene, creating endless possibilities for the application of graphene. Some of these applications include better transistors and semi-conductors, bendable or wearable electronics, faster charging and longer lasting batteries, better water filtration systems, targeted drug delivery, tissue engineering, and more. Through more research and experimentation, graphene has the potential to bring science-fiction technologies to life and change the world for the better.

Synthesis and Functionalization of DNA Coated Silica Nanoparticles

Tyler Gore

Abstract

Silica nanoparticles are a highly versatile nanomaterial due to their facile preparation and functionalization through surface chemistry. The primary focus of this work is the synthesis of multi-functionalized silica nanoparticles adept for use in highly ordered nanostructures. The synthesis of the silica nanoparticles is accomplished through a modified Stöber method. In this method an aqueous organic bi-layer is used to form highly uniform silica nanoparticles. These nanoparticles are then coated with a fluorophore before being encapsulated by a protective outer layer of siloxane. The outer layer of these nanoparticles is then functionalized with an amine group that can then be linked with a short oligonucleotide sequence. The resulting functionalized silica nanoparticles are then capable of being organized into more complex nanostructures through the hybridization of the DNA sequences found on the surface of the nanoparticles. The application of these methods provides a viable source of silica nanoparticles adept for drug delivery, biomedical imaging, and nano-photonic cell systems.

Synthesis of (3 β ;;5 α ,6 α)-cholestane-3,6-diol and 5-deutero-(3 β ;;5 α ,6 α)-cholestane-3,6-diol and their structural investigation using single- and two-dimensional nuclear magnetic resonance techniques

David Martyn

Abstract

Convenient methods for synthesis of (3 β ;;5 α ,6 α)-cholestane-3,6-diol and 5-deutero-(3 β ;;5 α ,6 α)-cholestane-3,6-diol from (3 β ;-)-cholest-5-en-3-ol were developed. Hydroboration and oxidation of (3 β ;-)-cholest-5-en-3-ol using deuterated or non-deuterated borane resulted in the formation of the corresponding (3 β ;;5 α ,6 α)-cholestane-3,6-diol products in good yield. Assignment of the ^1H and ^{13}C NMR spectra of cholesterol, (3 β ;;5 α ,6 α)-cholestane-3,6-diol, and 5-deutero-(3 β ;;5 α ,6 α)-cholestane-3,6-diol were made by using the following one- and two-dimensional NMR techniques: DEPT, 1D TOCSY, EXSY/NOSEY, 2D COSY, 2D TOCSY, HMQC and HMBC. Analysis of the collected spectra made assignment of all proton and carbon resonance signals of starting material and products possible.

The Impact of Nicotine on Adolescents

Abul Kasem Rahman, Vickie Jean, & Anika Bekkem

Abstract

The impact of nicotine on adolescents is especially prevalent today. Many are attempting to quit their addiction to the harmful substance, and many options are available to help. Some methods of nicotine intake include traditional smoking, e-cigarettes, and dipping. These methods each come with their own effects. One common method of addiction treatment is nicotine replacement therapy. This can be in the form of patches, lozenges, and nasal sprays. There are also several non-nicotine medications that assist in addiction therapy. Each method of nicotine addiction treatment chemically interacts with the body differently. This research will analyze how these chemical interactions occur and the advantages and disadvantages that different methods pose.

Chemical Security Education is needed for Undergraduate and Graduate Students

Chalita Thompson

Abstract

Chemical safety has become a central theme in chemical education, as of late . Recent academic laboratory and industry incidents have led to policy changes in government and academic programs to improve chemical safety. In contrast, not much is known about post-secondary chemical security education. The purpose of this study is to identify why there is such a large gap in the understanding of the need for chemical safety but not much for chemical security, while attempting to identify current practices and attitudes concerning chemical security. For the study, ACS-approved chemistry programs were surveyed to ask questions about their perceived chemical safety and chemical security culture, how chemical safety and chemical security is taught, and how often either were taught at their institution. Nearly all (>99%) of the institutions teach chemical safety to undergraduates at their institutions, 73% to graduate students, while only about one-third of the respondents say that chemical security is taught at any education level. A majority of respondents to the survey (96%) feel that chemical safety should be mandatory while about half (57%) felt that chemical security should be mandatory. The importance of chemical security education must be made a priority by the chemistry community in order for more institutions to commit to chemical security training for faculty and students.

Optimizing an Inorganic Chemistry Lab Experiment for determining the Spectrochemical Series and Magnetic Susceptibility of various Cobalt Complexes

Emily Cowen, Maggie Ward, Alexander Chandler,
Kassandra Camua, & Ryan Webb

Abstract

For many inorganic chemistry courses, the spectrochemical series is a classic topic to introduce students to ligand field theory and crystal field theory, as well as providing an entryway to magnetic susceptibility. Our goal was to adapt a lab based off of previously established syntheses for determining the spectrochemical series and number of unpaired electrons. Through this lab, students can compare the different colors and properties of various ligands in cobalt complexes, including glycine, oxalate, water, and ethylenediamine through UV-Vis analysis. The UV-Vis absorption can be used to determine the ligand strength and the d-orbital splitting. We were able to successfully synthesize these four cobalt complexes, perform UV-Vis absorption studies on them, and complete calculations to determine molar absorptivity and d-orbital splitting during a 3-hour lab class. During an additional lab class, magnetic susceptibility and number of unpaired electrons was determined using the Evans method on NMR or an Evans Balance.

The Development and Implementation of a Standard Operating Procedure and Interdisciplinary Applications for the Flame Atomic Absorption Spectrometer in Chemical, Biological, and General Areas of Study

Andreanna Turner

Abstract

Standard operating procedure and interdisciplinary applications for the flame atomic absorption spectrometer were developed for three academic classifications of students. These applications of an underutilized chemical instrument were applied to several academic fields. The chemical application focuses on analysis of lead or other trace metal concentrations in local tap water sources near and around Chickasha, OK. The biological portion utilizes the Flame Atomic Absorption spectrometer to study plant uptake of toxic metals introduced in early developmental stages. Lastly, the general science application investigates the metal content of pond water samples from the University of Science and Arts of Oklahoma. The standard operating procedure was implemented in an instrumental analysis laboratory, a freshman level biology course, and the general education foundations of science laboratory. These standard operation procedures can be broadly applied for use in a range of laboratory and research settings.

Understanding the Value of Good Health: The brain Chemistry and obesity

Abul Kasem Rahman

Abstract

Abstract :

There is a three fold increase of obesity across the globe for the last fifty years. Obesity is one of the leading risk factor linked to 4.7 million adult deaths globally in 2017 which amounts to 8.7%. According to the world health reports 39% of adults in the world are overweight. Among the children the ratio is about 25%, which is alarming.

Obesity is attributed to the imbalance of energy intake and lack of efficient utilization in our physiological system.

Many metabolic related disease such as high blood pressure, diabetes, cardiovascular are also attributed to obesity. Studies tells us that differences in brain chemistry could explain why obese people may be more tempted to eat than people of normal weight. Published data suggests that environmental factors also triggers to eat, such as food smells, were found to cause different reactions in the brain in obese people, compelling them to eat more often. This presentation will attempt to illustrate this paramount public health problem by presenting some relevant data to bring awareness thereby.

Increasing Student Preparedness Using Demonstration Videos in a General Chemistry Laboratory

Emily Falcon

Abstract

The use of interactive educational models is increasing in the new technological age. As shown in the Spring 2019 semester by two senior Chemistry students, undergraduates in General Chemistry 1 Laboratory classes would appreciate having demonstration videos to aid in their learning. These senior students made six videos and showed them to the students at the end of the Spring 2019 semester. This new project extends to showing the undergraduate students videos while learning the corresponding topic in recitation. The students' confidence in the material and perception of the helpfulness of the video was surveyed and evaluated one week later. Additionally, two new videos were made for the class (Making Tables in Microsoft Word and Equation Editor in Microsoft Word) and evaluated as before. These videos were made by taking screenshots of the process, inserting them into the website Explain Everything, and adding voiceovers and live drawings. A control class was used as a comparison for all the surveys conducted. Some of the videos had no effect on the students' ability to perform the given task, and others were significantly beneficial. This indicated that videos were as effective or more so than a traditional lecture-based recitation. Therefore, more demonstration and explanatory videos should be made for the chemistry laboratories so students can have an additional learning resource and some faculty could move toward teaching recitation in a flipped-classroom styl

An Investigation into Weather's Effect on Aerosol Particles Using WRF and MAPSS

Hayden Webb

Abstract

In this research, we examine the effects of weather phenomenon on the distribution of aerosol particles. Our work method involves using NASA's MAPSS database along side NOAA's WRF software. Our work-environment for this research is on OU's Schooner system. We plan to conduct a historic study of the Tsunami that struck Fukushima in 2011, as well as a local study of the Stillwater area. We expect our results to show that weather events play a substantial part in the distribution of aerosol particles.

ThunderStore: A cheap & effective cashierless system with RPi

Shi Zhe Ting & Ri Hao Yong

Abstract

The average time spent grocery shopping is 41 minutes. It amounts to over 50 hours a year spent in a grocery store. The implementation of a cashierless store would be able to reduce the time spent at a store by half. This not only increases overall productivity but also quality of life. Our project implements the cheapest and most effective way to create a cashierless system with Raspberry Pi.

Building Social Media Applications to Incentivize Real World Human Interaction

Caleb Power

Abstract

The rise of easily obtainable computing machinery and cost-effective internet access has led to the development of various social media platforms and e-commerce sites. This has led to the decline in both the amount of time that individuals spend interacting with other people in public and the amount of in-person business that companies receive, harming small businesses. The objective of this project is to provide a solution to both problems by using location verification techniques to give individuals opportunities to earn and redeem rewards at local businesses, thus incentivizing individuals to interact with each other in person. We've developed this solution by building a mobile app with Google's Dart programming language, Flutter UI toolkit, and Firebase backend platform to ensure usability, security, stability, and low maintenance costs.

Leozone: A Spotify Inspired Music App That Caters to Your Genre-specific Needs

Ri Hao Yong

Abstract

Leozone is a mobile app that's developed specifically to help users upload, store, stream and most importantly categorize songs into countless different unique genres. The app is developed specifically to satisfy each user's need to have their treasure trove of old songs stored in genre-specific playlists. Flutter SDK is responsible for the app's front-end for Android and iOS devices compatibility, while the back-end of the app utilizes Google's Firebase Cloud platform. Leozone utilizes a few services in the Firebase's family which includes Firebase Authentication, Firebase Cloud Firestore, and Firebase Cloud Storage. With Firebase Authentication, users are able to sign up and sign-in to the app with an email password combination. With Firebase Cloud Firestore, user's personal information regarding their Leozone's account, song details including song title, artist, genre, et al., and playlist details including playlist title, genre, et al. are stored in a NoSQL Firestore database. With the usage of Firebase Cloud Storage, big files like the user's profile image and songs could be uploaded and stored in it. The process is designed in a way that uploading files, and updating image/songs URL on Cloud Firestore are both performed consecutively. In conclusion, Leozone helps keep user's favorite songs in the cloud while organizing them into their personalized playlists. Streaming and vibe-ing to the right songs at that right mom

LeolexaPi: An Alexa Housed Raspberry Pi to Make Home Automation a Breeze With Leolexa Home

Ri Hao Yong

Abstract

With a simple idea in mind to create a virtual assistant that you could interact with and help automate various functions and tasks at home, LeolexaPi was born. LeolexaPi is a fusion between Alexa and the Raspberry Pi where Alexa is directly housed in the Raspberry Pi and used to control your lights, alarm, and temperature at home. To simulate that environment and process, in addition to having Alexa downloaded, tweaked, and install on the Raspberry Pi, a breadboard was also set up with multiple LEDs (Light Emitting Diodes), a DHT-11 (Temperature and Humidity Sensor), and an Active Buzzer (Alarm) to represent various amenities we could see and control in our own home. With just your voice (or text if chosen), LeolexaPi is at your command and could help turn on lights in different rooms, sound the alarm in situations of emergency, and check the indoor temperature and also humidity, all in the vicinity of your home with ease and efficiency.

Virtual Reality Tower Defense Game

Ren Jian Lee

Abstract

The aim of this research project is to create a unique style of gameplay for traditional tower defense games. This project includes a first-person perspective in tower defense gameplay by implementing it in virtual reality. This allows the player to control a character that can assist the turrets in eliminating waves of enemies. Unity provides many helpful tools to accomplish this and is utilized throughout the course of this project. The game includes features such as wave spawns of enemies, a shop for turrets, and currency. The enemies have set health values and movement speeds; the turrets have set costs, fire rates, and damage values. The waves of enemies increase in number as each round is completed. This project involves numerous scripts that provide various functions such as animating the bullet projectiles and explosions, camera movement, spawning of enemy waves, menus, and a NavMesh agent that the enemies use to find their pathing. Design patterns were used to control the enemies' behavior and centralize references to shared resources. Some enemies can shoot at the player, creating an exciting experience for the player. The player must navigate the map and purchase turrets to kill the enemy units before they travel to the end of the path and reduce the player's health. The results of this project are a rarely-seen style of tower defense gameplay that could prove to be enjoyable and a better understanding of Unity game development.

Skiing Through VR: Creating and Using Unity and Android VR

Chase Minden

Abstract

Unity is a very diverse engine, and it's no surprise that it comes fully equipped to handle creating VR games. That is what I was challenged to do for the spring 2019 semester: create a unique VR experience using Unity and Android's software development kit (SDK). Starting off was the hardest with thinking of ways to make an experience that would really capture the VR aspect. When creating a sample scene, I found a few models for some snowy mountains, and from there I decided on making a skiing simulator of sorts. With a bit more experience in my pocket from working with Unity in the fall 2018 semester and a few tips I picked up from ORD 2019, I was able to start my vision relatively easily. Unity made setting up a player character easy with their presets, adding forces on a global scale was as simple as adding a component, and using navmeshes to create pathfinding AI was only a download away. All I had to do was piece a few of the components together, code up some arrays of locations for the AI to find and make some UI for the player to read the environment, and my vision was done. Of course, there was a lot of trial and error in this process, but looking back on how simple it was to create something like this in VR has me excited to continue working with it and see what else is possible.

HHL Algorithm: The Power of Quantum Computing

Jiahao Zhao

Abstract

Research on quantum computing shows the potential that computation complexity can be much faster. In 2009 the professor Seth Lloyd created an algorithm called HHL that can solve the linear system faster than a classic way. Quantum computing uses the idea qubit that can do two computations at the same time. Instead, to find the exact solutions, the big picture is to find the inverse of the eigenvector of the original matrix, come up with those qubits. The result shows that we can solve the system of the linear system in the big O of a multi-log complexity, where the classic way can only solve it in big O of polynomials. In that case, quantum algorithms are much faster than the classical algorithm when solving a linear system. However, unlike the classic algorithm, the drawback of the HHL algorithm cannot tell us explicitly answer, the answer can only be represented by the inverse of the eigenvector.

Housing Price Prediction

Bibek Roy

Abstract

We are going to analyze and predict the price of housing. We use the housing dataset of Ames, Iowa to train and test the machine learning model. The technologies we use are Python language, Github, Kaggle, Google Colab. The part of supervised machine learning we use is regression and different techniques.

Using Machine Learning to Predict Student Success Rates

Sean Gausman & Jicheng Fu

Abstract

This research explores using machine learning to identify student enrollments that will potentially lead to failure. Failure, in our case, refers to a grade of ‘D’ or below. Withdraws are also considered a failure.

This software could be used to inform students, advisors, and more. Interventions will be made in a timely manner to help the students by support staff and tools. The advisors could use the data to help a student enroll in a successful schedule.

The goal of this research is to improve the accuracy of our intelligent model as much as possible by using feature selection, different training techniques, combining multiple machine learning algorithms, and creation of advanced features. In particular, creating advanced features includes combining certain features to create new features, such as Average Grade Anomaly.

Super Education for Supercomputers

Ezgi Gursel

Abstract

Supercomputing is growing at a rapid rate. From government agencies to hospitals, many organizations rely on supercomputers for a variety of purposes. Marked by their potential to solve highly technical and complex problems, supercomputers could be considered the future direction of the information age. However, the growth of supercomputing poses the problem of training qualified individuals for the supercomputing industry. This poster aims to answer the question, how does supercomputing training occur? This material is based upon work supported by the National Aeronautics and Space Administration under Grant No. NNX15AK02H NASA Oklahoma Space Grant Consortium.

Depths of Deep Learning

Dr. Jawad Drissi & Jesse Tobias

Abstract

Neural networks are able solve problems that previously were beyond our reach. This was possible due to the work of Yann LeCun describing the creation of Convolutional Neural Networks (CNN), Geoffrey Hinton who demonstrated Error Backpropagation. This presentation will give an overview of neural networks and how they function. The hidden layers will be explained with types of neurons and algorithms that are commonly used in deep learning. Also, we will provide links between artificial intelligence, machine learning, and deep learning. We will explain how LSTM nets will improve malicious code detection in IDS systems. Though the outcome is promising in both detection and decrease in detection delay there are still several variables that can influence system performance and need to be researched further.

The Expected Safety in Self-Driving Cars Technology

Joseph Gudger

Abstract

This presentation describes the implementation of autonomous vehicles (AVs) or self-driving cars into our society from developments in the past, the present and the expected safety of self-driving cars technologies. Remote controlled vehicles have been around since 1926. In 1980, major advances in autonomous vehicle technology was made by Mercedes-Benz with the advent of its vision guided Mercedes-Benz robotic Van with the focus being on the vision guided systems using LiDAR (radar, GPS and computer vision) to control the vehicle. The technology developed from this autonomous vehicle help advance the technologies in the present modern semi self-driving cars like adaptive cruise control, anti-locking braking system, blind spot vehicle detection, steering assist, lane parking, and other new features. In this presentation, we also describe some safety issues dealing with how AVs must learn how to negotiate driving pattern involving both human drivers and other AVs, the decision-making systems, and cyber security concerns.

The Workings of Blockchain

Carlton Harris

Abstract

Blockchain is a new technology defined as an open ledger that offers decentralization to the parties. In addition, it also offers transparency, immutability, and security. It has many features including being open, distributed, ledger, P2P and permanent. Blockchain also creates privacy and security for the Internet of Things (IoT) domains, A.K.A the Internet of Everything (IoE). We will describe how the blockchain functions and the different systems of blockchain. We will show you some applications of Blockchain like bitcoin, banking ledgers, and medical transcripts.

Security in Drones

Reginald Dozier & Dr. Jawad Drissi

Abstract

The use of unmanned aerial vehicles (UAVs)/ Drones has increased exponentially over the last decade for a broad range of applications. The recent commercial availability of a new generation of small UAVs/drones has emphasized the growing threat posed by these machines. This paper will discuss the security threats posed by UAVs in areas such as terrorist attacks, illegal surveillance and reconnaissance, smuggling, electronic snooping, and mid-air collisions, in addition to discussing on the categories of UAV intrusions in terms of intention and level of sophistication of the operators. The focus here is to raise awareness about the security, privacy, and safety aspects associated with the deployment of civilian drones into the national airspace.

Overview of 3D Printing

Jackson Holloway, Dr. Jawad Drissi, & Marilyn Li

Abstract

3D Printing, also known as additive manufacturing, is the process of physically creating an object by taking a model created in or scanned in through the 3D modeling software and constructing it by extruding materials in successive layers using specific hardware. This paper will present an overview of 3D printing technologies and their capabilities. The flexibility and low barrier to entry of 3D printing technologies are a catalyst for innovation and reduction of costs of manufacturing. These 3D printing applications are being used in a wide range of fields, such as the automotive, aviation, health care, and electronic industries.

Simultaneous Localization and Mapping Analysis

Jacob Miller

Abstract

Simultaneous Localization and Mapping (SLAM) is an open research area in the field of robotics. SLAM is how many robots navigate an unknown environment, but there are several approaches used today. This project has found three algorithms in common use and compared them using a simulation. Robot Operating System (ROS) was used for both the SLAM algorithms and the simulation software. Additionally, the algorithms are hoped to be deployed and tested on hardware using a custom built Turtlebot. This research was funded in part by the Dr. Snowden Memorial Scholarship with the NASA Oklahoma Space Grant Consortium. This material is based upon work supported by NASA issued through the OSGC.

Upcoming Methods Used to Process Big Data

Brayden Harris & Dr. Jawad Drissi

Abstract

Big Data encompasses a lot of different data and data types, as information technology continues to evolve so must data analysis. This in turn has caused Big Data to push data analysts to find better and better ways to analyze the data being collected. The purpose of this research is to look into the algorithms and other methods that are being used to make analysis easier. Some of the methods include clustering of data in order to look for hidden patterns through grid-based clustering. Use of MapReduce and Hadoop, which receive and process data in parallel in order to deal with huge volumes of data. And by organizing it through a mixed framework in order to truly create a thorough level of organization that allows for the best data analysis. This paper will describe these new methods used to process data that have enabled organizations to deal with problems related to Big Data.

Facial Recognition Using the Viola-Jones Algorithm, PCA, and ANN

Antoine Charles

Abstract

What allows smart technology to capture our many distinct facial features is a process of complex algorithms working in real time to provide up to ninety percent accurate identification of faces. The Viola-Jones algorithm, principal component analysis (PCA), and artificial neural network (ANN) offer their own solution to facial recognition. Viola-Jones algorithm has the distinct advantage of providing the most accurate rate of recognition with the fastest facial tracking. PCA while only able to produce an accuracy rate of seventy-two percent and ANN with ninety-two percent coupled together as a proposed method it is possible to bring accurate facial recognition to ninety-four percent. This paper will bring forth a proposed methodology that could drastically increase facial recognition accuracy and the speed at which it algorithms are able to identify a human face.

Keywords: Viola-Jones, Principal Component Analysis (PCA), Artificial Neural Network (ANN)

Spaceship VR: Varied Movement and Dynamic Terrain with Unity and Android VR

Chase Minden

Abstract

Spaceship Run VR: Varied Movement and Dynamic Terrain with Unity and Android VR

The idea for this project didn't come from me, my girlfriend had told me about her idea to play a first-person Temple Run type game, and she told me I should try making that possible. I started the project with a simple 3D Unity template, and after working on it for a full semester I'm surprised at how little the game required asset wise, but it did require a lot more scripting wise. By using some downloaded prefabs from the Unity store, I was able to start modeling the pieces I needed, which I decided to make space-themed just for fun. The first challenge was dealing with the movement input for the Unity first-person controller, which is normally done by joystick input and camera look angle. I wanted to make the game as joystick free as possible, so I set the speed to constant and left the camera. This caused problems whenever the player could look back and move back because I wanted to keep them moving forward. To solve this, I thought about locking the movement vector when in hallways to keep the player moving, so they could still look around without affecting movement. By using box colliders set as triggers, I was able to accomplish this goal with a lot more modifications to the PlayerMovement script Unity provides. Overall, I am very happy and proud that I was able to complete a very beginning version of this idea and am excited to move on.

Investigating the relationship between Human Development Index and Corruption Perception Index for all countries.

Imuseoluwa Obembe

Abstract

ABSTRACT

A random sample of 35 countries were selected and data were collected for the countries. The two sets of data collected for the selected countries were the Human Development Index (HDI) and the Corruption Perception Index (CPI). The research was to see if there was any relationship between the Human Development Index of a country and its Corruption Perception Index; the Human Development Index as the independent variable (x) and the Corruption Perception Index as the dependent variable(y). Our hypothesis was that there would be a positive linear relationship between the HDI and the CPI. We used a normal correlation, a scatter plot, a residual plot and a histogram to check the relationship between the two quantitative variables. Based on our analysis of the results, our hypothesis was true. The scatterplot shows a linear relationship between the HDI and CPI, the residual plot shows no funneling and the histogram is unimodal and approximately symmetric. These findings proved our thesis to be true.

When Voting Theory Methods Produce Different Winners

Elizabeth Wissler

Abstract

Demand is rising for distance learning options, which has created a need for large libraries of problem sets. Creating these libraries manually is time-consuming and effort-intensive, which is an opportunity for automation. The availability of a virtually unlimited number of problem sets for a given topic gives teachers the ability to quickly create new example, homework, and test problems without the need to purchase pre-made problem sets. This can be particularly difficult when setting up complicated problems with the intent of finding a specific outcome, such as finding the original conditions that lead to voting methods producing different winners.

In this project, we worked toward determining required initial conditions that lead to the Plurality, Instant-runoff, Condorcet, and Borda Count voting methods all producing a different winner. Oftentimes, there is no majority winner, hence the concept of determining a “fair” winner is objective. This demonstrative problem intends to encourage students to think critically about political fairness.

The Revolutionary Technology of Virtual Reality

Christina Sivasankaran & Dr. Jawad Drissi

Abstract

Virtual reality (VR) immerses users in a computer-simulated world and has been used for a variety of practical and entertainment purposes. VR is able to create a virtual environment that allows pre-med students to practice risky procedures, prepares astronauts for space explorations, mission planning and execution of military exercises, trains pilots on new fighter jets, and allows architects to create and view a structure before they break ground. With virtual reality, we can experience and learn how to explore dangerous situations without the concern of actual danger. In addition to these practical applications for VR, it is also a popular form of entertainment providing immersive and exciting gaming experiences for users. In this paper, we will touch upon the history of virtual reality, delve into the diverse classes of VR systems, examine the technicality of its hardware, software, framework, algorithm, and discuss the future of virtual reality.

Honeypots

Hagan Holsapple

Abstract

Honeypots, in simple terms, are a computer defense mechanism to track unwanted activity on a network. Mostly used for businesses this can help protect against cyber-attacks which can result in client information being stolen, shutting down the network, or sensitive company files stolen. Depending on which type of Honeypot you need to deploy can vary on the difficulty. My research will look into the different types of honeypots and the easiest way to deploy these to a network.

Using K-Nearest-Neighbor to Classify the Angle of Impact of Individual Bloodstains in a Crime Scene

Alexander Mullis & Jicheng Fu

Abstract

This objective of the proposed study was to create a system using K-Nearest-Neighbor algorithm to determine the angle of a blood drop on a surface. With this research, bloodstain pattern analysts can take photos of a victim's bloodstains and determine the angle of impact quickly and accurately, in some cases, more accurately than what they would be able to achieve on their own. With this system, bloodstain pattern analysis can be more automated, allowing analysts to focus on other elements of the crime scene. By using a photo of an isolated blood drop on a surface, the system is able to determine the angle in 10 degree increments from 10 to 90 with 70, 80 and 90 degrees being grouped together. The system creates an hdf5 file with all of the test and train images. These images are 32 x 192 grayscale individual blood drops. The system then loads this file and begins the KNN process of determining angles. The results show an 80%-85% average success rate. Individually, some of the angles are identified at super-human performance. In our further research, we will tune the system and collect better/more blood drop images to improve the overall accuracy and individual angle accuracy.

Performance Comparison between B-tree and LSM-tree

Dr. Gang Qian

Abstract

B-tree and LSM-tree (log-structured merge-tree) are two different types of data structures used in data management systems to implement indexes, which support efficient query operations. B-tree is a traditional technique, which is widely used in relational databases, while LSM-tree, a relatively recent development, is more frequently used in non-relational databases. In theory, LSM-trees tend to be superior at writing while B-trees are better at reading. In this project, we compared the insertion and search performance of the two tree structures. These experiments utilized some existing open-source implementations developed in C++. The implementations were customized so that the trees used comparable parameters in the study. Insertion, searching and a mixture of the two operations were included in the experiments.

Security Robot

Rad Alrifai

Abstract

This project derived from an interest of having a robotic home security surveillance system that could be maneuvered around a house for live video streaming. The system allows the user to remotely navigate throughout their home and see what is happening in the various rooms. The robot implements a Raspberry Pi to create a webserver and capture the video via a connected camera. An Arduino Uno is also utilized to control the motors of the robot. The webserver was developed using Python, HTML and JavaScript. C# was used to write code for the Arduino.

Utilizing Machine-Learning to Uncover Hidden Factors Contributing to Obesity among Hispanic Preschoolers

Leif Nevener, Jicheng Fu, Shashank Ranga, & Keerthi Kancherla

Abstract

Childhood obesity increases the risk for children to develop type two diabetes, cardiovascular disease, and cancer later in life. The United States Health Department found that Hispanic children are the most at-risk demographic among children for childhood obesity. However, few research studies are available to explain why this ethnic group suffers from such a high obesity prevalence. This project focuses on uncovering the hidden components related to obesity in Hispanic preschoolers ranging from 2-5 years old through the use of cutting-edge machine-learning techniques. The data to be utilized in this study is obtained from a previous study, where 238 Hispanic families were involved. Qualitative and quantitative data gathering methods were employed to study the health habits of Hispanic families and different attributes that indicate healthy lifestyles. We will need to overcome significant challenges inherent in this dataset, such as missing values and a substantial number of variables (> 300). Particularly, variables irrelevant to childhood obesity may adversely impact the learning quality of machine-learning techniques. To address these challenges, we will employ statistics, unsupervised learning, and deep neural network techniques in combination to identify relevant variables and construct an intelligent model to accurately predict the possibility of childhood obesity.

Extending the Supercomputer User pipeline to SWOSU

Andrew Roberts

Abstract

Supercomputers have been a key enabler to many technological advancements.

The pipeline to develop capable supercomputer users is years long.

Getting started with a supercomputer can be difficult.

As a part of the XSEDE EMPOWER Learner program, this research focuses supercomputer user development.

SWOSU students do not have working code for many of the training modules available for learning supercomputing.

This research details the development of these codes based on materials provided by the National Science Foundation, Shodor Foundation, and National Center for Supercomputing Applications.

The result of this research is a better understanding of supercomputing training and more tools available to SWOSU students.

Bringing SLAM and ROS to middle and high school students

Jacob Miller & Clark Kurtis

Abstract

Simultaneous Localization and Mapping (SLAM) is an open research area in the field of robotics, SLAM is how many robots navigate an unknown environment. There are several approaches of SLAM used today. Robot Operating System (ROS) software is used to control both SLAM and a simulated environment that SLAM operates in. The process to implement these into a virtual machine and a TurtleBot is a complicated process. The goal of this project is to build a simplified tutorial for middle to high school level students to work them through the process step by step. As well, to allow them to understand each step in the process and what is happening. This research is funded in part by the Dr. Snowden Memorial Scholarship with the NASA Oklahoma Space Grant Consortium. This material is based upon work supported by NASA issued through the OSGC.

Increasing Student Participation in Virtual Class Meetings for Computer Science Classes

Teko Bekkering

Abstract

Virtual Class Meetings (VCMs) are classes delivered over the Internet synchronously but location-independent. Compared with traditional face to face classes, VCMs offer multiple two-way communication methods that increase student participation in the class. We show our most effective methods.

Neural Networks: A study on how it came about and everything else

Shi Zhe Ting, Ri Hao Yong, Norbert Puchala, & Ren Jian Lee

Abstract

The goal of this review is to compile information about the history, idea, and future of neural networks. Articles were found using the IEEE and ACM databases. Articles used in this review are dated from the mid-1900s which are used for explaining base topics of neural networks to more recent articles from the 2010s to show current and possibly future trends of neural networks. Advancements in hardware has allowed for practical applications of neural networks. Changes in the structure of neural networks has allowed for faster and more accurate classification.

The review has compiled information from the base units of neural networks to current research being done to make them more efficient. In this review we included information regarding topics that span from the perceptron to hardware used to make neural networks more efficient such as the Tensor processing unit. We conclude through our review that neural networks are an important and ever-growing advancement.

Rabbit Pet Simulator in Augmented Reality

Ren Jian Lee

Abstract

The aim of this research project is to create a pet simulator using augmented reality. Utilizing a mobile device's camera, a player will be able to place a pet rabbit in whatever environment they are in and interact with the rabbit. Unity and Google ARCore provide many helpful tools to accomplish this and is utilized throughout the course of this project. The pet simulator includes features such as spawning a rabbit, enlarging it, rotating it and tapping to make it move. The rabbit has animations when it is idle and when it is moving. This project involves several scripts that provide various functions such as detecting the ground plane, instantiating a pet rabbit, controlling the movement of the rabbit, and removing the rabbit from the scene to start over again. The player will be able to enjoy having a rabbit in the room virtually without any real-life responsibilities; this application might be used to experience what it might be like to have a pet at home before getting a real one. The results of this project are a pet simulator with cool features, more experience with Unity game development and a better understanding of augmented reality application development.

Take Back Your Power: Five Things Everyone Must Know About Mental Illness

Oscar Garcia

Abstract

Mental illness is becoming more common in the United States. Statistics show that 1 in 5 adults are victims to some type of mental illness. The presenter, Oscar Garcia, will discuss about anxiety disorders, the types, signs, and symptoms of mental illness, and the long-term effects of mental illness if it is left untreated or ignored. Oscar also hopes to raise awareness among his audience members on how people with mental illness can find relief from their symptoms and discover ways to cope effectively.

School Bullying Affecting America's School Children

Levi Peck

Abstract

This presentation will offer an insight into current statistical data on school bullying and school shootings. Along with this, this presentation will give insight into the public's viewpoints on school bullying and their experiences with school's policies and methods to combat bullying and its effects.

The Kidnapping of Peter Weinberger

Elizabeth Daley

Abstract

The kidnapping of Peter Weinberger stunned the country in 1956. It brought a dreaded reality to the average family. During my research, I found that kidnappings, the taking of a child by a stranger, were not common in the era of the 1950s. A headlining kidnapping case prior to Peter Weinberger was the kidnapping of the Charles Lindbergh Jr. in 1932. His father was a well-known aviator. The difference between the two kidnappings was that Peter Weinberger belonged to a loving, average family. It hit home that this type of victimization could happen to anyone, not just to the elite. This kidnapping brought fear into the thoughts of every average family in the country. I explored the possibilities of reasoning behind kidnappings and what could possibly go through the mind of the kidnapper. How could someone take a child from a family with no second thought or regret? The aftermath for the family now lacking one of their beloved children, but also the aftermath for the kidnapper's family, can be absolutely devastating.

Women leadership in Oklahoma law enforcement agencies

Kendra Brown

Abstract

Oklahoma has had very few females employed in law enforcement. Research will show that very few women in law enforcement have held a leadership position in Oklahoma. However, more women are currently being employed in leadership positions in Oklahoma than before, which will be proven through historical analysis. The ladies of the badge are picking up momentum and are here to stay.

The Rights of a Victim of a Felony Crime in the American Legal Court System”

Trenton Palmer

Abstract

I will be during research over the rights of a victim of a felony crime in the American legal court system.

Discrimination on Women in the Criminal Justice System

LeAnna Aycock & Samantha Mackey

Abstract

I will be researching discrimination on women in the criminal justice system. I will be looking at previous cases where women commit a felony and get away with it. Women can acquire lesser punishment being that they are female, so society believes they could never do such harm.

Baili Gunter

Abstract

It is a known fact that since the beginning law enforcement was and still is a male-dominant occupational field. This presentation will analyze the rise of female officers in the struggles enjoys their face and endure

Juveniles Rights in the American Judicial System

Kobe Gipson

Abstract

This presentation will cover the many different court cases that have shaped the juvenile laws and treatment in the American judicial system. Looking at the changes that have been made over the years, with the specific court cases that changed the previous laws and sentences. While also looking at who may be held responsible for certain acts by juveniles.

Saudi Arabia police

Turki Alqahtani

Abstract

With the developments of insecurity across the globe, the world is not only interested in safety but also improvement in oversight roles. In many ways the security breaches have been due to the laxity of the oversight committees and security force in general, this paper will highlight the weaknesses and the strengths that are exhibited by the police in Saudi Arabia . As such the paper shall also generalize its purpose and compare the security issues within Saudi Arabia and across its borders. In many instances, it might serve a better purpose for the security risks to be handled by an informed force and not one blinded by the monotony of power. This would be one of the many reasons and resolutions that would be preferred in the attainment of the security roles and purpose. Towards the alignment of reasons, it is important to focus the general purpose towards the achieving of the capable prospects that might led the population and assure them safety. With this the paper will be generally a research task that will be labelled on the purpose and understanding of the Saudi and the Improvement and achievements made by their police and the oversight policing

Discrimination of Women in the Criminal Justice System

Samantha Mackey & LeAnna Aycok

Abstract

From my research I will cover the cases of women in the system who have acquired different sentences than men who committed a similar crime. I will attempt to give insight on the fact that women often are sentenced lesser time than men and why that may be. Factors that contribute to the rising rates of women being entered into the system will also be included in order to discover why they may be given more lenient sentences.

Testing Coiled Nylon Threads as Artificial Muscles for Exoskeletons

Shawn Ray

Abstract

The popularity of robotic exoskeletons in rehabilitation has recently been on the rise. However, one of the main limitations of these robotic exoskeletons is the large weight that is put onto the user and its bulkiness. Researchers have been looking into creating lightweight artificial muscles to help reduce the weight of robotic exoskeleton systems dedicated to rehabilitation purposes, and thus and better the rehabilitation process for the patients. These artificial muscles are being created by coiling nylon string and applying heat to the coil so that it can produce a contracting force. The proposed project is, first recreate these artificial muscles, and second characterize their behavior. Our study shows that it is possible to create artificial muscles by coiling nylon string, and that these muscles contract when heated. For future applications, the artificial muscles will be made using conductive nylon to use electrical stimuli instead of an external heat source to produce a contraction force.

Perceptual Optimization of Fast Magnetic Resonance Imaging Techniques

Yuhao Jiang

Abstract

Magnetic Resonance Imaging (MRI) is a fast developing image modality. The major drawback of MRI is the long acquisition time. Fast imaging can improve MR imaging by reducing motion effects that adversely impact clinical usage, by providing new information, and by increasing patient throughput. Developing a new method in fast MR imaging is both time consuming and expensive. Also, it comes at the expense of image quality. Human perception model, which includes human visual system properties, can provide quantitative values for the assessment of image quality. A new MR dedicated human observer model was developed by incorporating the analysis and physiological and psychophysical concepts. Phantom and simulated images was created to test the model. We applied this model to quantitatively guide the development and optimization of fast MRI methods.

In Vivo Evaluation of Novel PEGDA-PCL Scaffold for Cartilage Generation

Helga Proгри

Abstract

Our long-term goal is to develop a functional scaffold that can be used on multiple tissue types and maintain functionality under load-bearing conditions in the human body. Our lab has developed a PEGDA-based composite scaffold, by sandwiching PEGDA in between PCL nanofibers, thereby creating a PCL-PEGDA scaffold. Our goal is to determine whether the scaffold improves the rate of cartilage formation and establish a protocol for histology to examine the amount of cartilage formation. Animal studies were performed at OUHSC. Each rat got two of either PEGDA or PCL-PEGDA. Rats were returned to normal cage activity and euthanized after 28 days of implantation. Samples were fixed, embedded within the acrylic resin, and sections were cut using a rotatory manual microtome. Sections were stained with Safranin-O and with H&E or picrosirius red and imaged by bright-field or polarized light microscopy. Histology examinations revealed progressive tissue formation with distinct morphological differences in tissue formation in regions around the grafts. Higher amount of disc height was found at PCL-PEGDA compared to only PEGDA scaffolds. This study advances orthopedic cement research by providing the understanding of how the electrospun fiber anchored PEGDA is affected at in vivo conditions. This novel PCL-PEGDA would provide an environment required for enhancing tissue integration with native tissue that produces better clinical outcomes for cartilage repair or regeneration.

Quantifying Effective Viscosity of Microswimmer Suspensions

Marion Mantia, Mel Vaughan, & Gang Xu

Abstract

The flagellum is a microscopic hair-like structure that allows cells to move. These motile cells produce a force on the fluid surrounding them and cause mixing as a result of this flagellar motion, which is very influential to material transport, or bio-mixing, at a cellular scale. Since there are a variety of beating patterns which are created through relative doublet sliding as a result of the motion of the radial spokes, this mixing is often difficult to understand. Therefore, to quantify the effects of active micro-swimmers on the rheological properties of the medium, the effective viscosity of flagella-powered microalga suspensions will be measured. The unicellular bi-flagellated green microalga *Chlamydomonas Reinhardtii* was used, because they can model the microalga used in biofuels as well as human cells. The effective viscosity of active suspensions was measured with various cell volume fractions at different shear rates using a cone-and plate viscometer. These measurements can determine the effect of the motile cell has on the rheology of the suspension, and, consequently, the suspension's ability to transfer material, or bio-mix. The results of this project will lead to a greater understanding of how the mixing of active particles directly influences biofuels. This research will also broaden our understanding of how to utilize the effects of the flagellum to direct material transport, which could be used for the advancement of disease treatment.

Smart Medical System for Analysis in Cardiopulmonary Resuscitation (CPR) Quality.

Erin Drewke & Mai Pham

Abstract

Cardiac arrest occurs in 2-6% of children admitted to Pediatric Intensive Care Units, where severe hypoxia and respiratory failure are the most common causes. Accurate, non-invasive, and real-time monitoring of oxygenation and circulation is paramount to improving Cardiopulmonary Resuscitation (CPR) outcomes. To address this, the Smart Medical System will interface three types of monitoring technology crucial for assessing resuscitation efforts: Near-Infrared Spectroscopy (NIRS), Volumetric Capnography (VCap), and Arterial Line sensing, to analyze and communicate CPR procedures as stated in the American Heart Association Pediatric Advanced Life Support (AHA PALS) procedure. Simulink and C-Code from MATLAB will receive data and automate the PALS procedure. Inputs will be readings from the monitors. Outputs will be conclusions after data processes through parameters. An electrical circuit with XOR digital logic will send HIGH outputs to HDMI pins 13/18 for Sink-Source status changes. This will display or embed necessary screens and messages to the physician to optimize CPR. The following non-invasive values may extensively assist in the assessment of CPR: rSO₂ from NIRS for circulation of oxygen; EtCO₂ from VCap for CO₂ elimination in the lungs; Heart Rate (HR) and Blood Pressure (BR) from Arterial Line sensing for pulse presence. The Smart Medical System will need a shield to protect interface connections from defibrillation impacts as shock is used in the PALS procedure.

Electrical Mechanism for a Digital Light Processing 3D Printer

Eileen Hernandez & Mohammad Hossan

Abstract

The digital light processing (DLP) is recently used in 3D printing of parts for faster speed, greater details and better surface finish. Digital Light Processing 3D printer is capable of curing photosensitive resin with the use of a UV light source reflected on specific areas to form a specific 3D shape out from the resin bath. This poster presents the design and performance evaluation of an electrical control unit for a DLP 3D printer. The control unit consists of various components including sensors, microcontrollers, motors, and switches. A raspberry Pi 3, a microcontroller, was programmed to control NanoDLP, an open source platform for slicing and image processing, as well as mechanical actuation system. The developed control unit was tested and optimized to synchronize the exporting and slicing of 3D STL files of parts into a projector and monitor process parameters such as temperature of the unit, exposure time, z-axis range and emergency shut off. The test demonstration shows that the developed control unit can successfully perform the specified job with accuracy and precision. Therefore, the developed electrical control unit can be used to command a DLP printer to work under user defined conditions. It also provides a least expensive alternative to the currently available electrical control unit for DLP printers.

Design and Fabrication of Mechanical Actuation Mechanism for CLIP Printers

Mohammad Hossan& Connor Self

Abstract

Continuous liquid interface production (CLIP) has recently revolutionized the additive manufacturing technology with faster processing time, maintaining excellent isotropic properties and superior surface quality of the finished product. However functionality and process optimization of the CLIP printer heavily depends on the accuracy and precision of the mechanical actuation system. Mechanical actuation system coordinates and ensures optical requirement, curing time and processing speed of the CLIP printer. This project examines the design and manufacture of a low cost but highly efficient mechanical actuation system. Actuation system was initially designed and optimized with 3D modeling using AutoCAD, a computer aided design (CAD) software. The designed system consists of stepper motor mounted in a lead screw to provide a linear slide for the platform, flexible resin container, digital light projection (DLP) projector holder and an adjustable build platform. The individual parts in AutoCAD modeling were converted into STL file/G-codes and printed using an ObjetPro 30 3D printer. The actuation system was then assembled with the in-house manufactured parts and tested. The developed system was able to produce linear motion with at demand and variable speeds without mechanical noise and vibration. The developed actuation system will provide more flexibility and reduce the cost of CLIP printer.

Power Quality Measurement System

Michael Martin & Kevin Ghale

Abstract

Power quality is a theoretical measurement of the efficiency of the power, in voltage and current, that a system's components are receiving compared to optimal supply. A system experiencing "poor" power quality can cause components to fail leading to system downtime, economic failure, and overall machine failure. Placed between the power source and the machine unit, the proposed Power Quality Measurement device will utilize live data-acquisition to measure the harmonic distortion and other power qualities flowing from HVAC units back to the supply source. Variable frequency drives and other high-speed switching devices utilized in an Air Handling Unit (AHU) are prone to sending harmonic distortion back down the supply line toward the transmission station, which results in users being penalized by electrical companies. The device could also be utilized for predictive maintenance purposes to notify technicians when motors or other components are requiring maintenance before causing system failure. The device will be an embedded circuit system including an evaluation board equipped with current and voltage inputs for reading 3-phase-480 volt systems, and a communications system(micro-controller) that will transmit the power quality data to a SMART device via an IoT controller over a serial communication. The communication stack will relay data to a user interface for company technicians for easy monitoring.

Attachment of fibronectin with titanium by tresyl chloride activation method: chemical and cell analysis

Dhakshyane Tamil Arasu

Abstract

Basic terminal hydroxyl groups of a pure titanium surface react with tresyl chloride, which allows for further coupling with fibronectin. Previous in vivo studies using a rabbit femur model found that immobilizing fibronectin onto cylindrical pure titanium implants enhanced bone regeneration around implants. However, pure titanium has limited applications in the biomedical industry due to its inferior mechanical and biological properties, compared to biomedical grade titanium alloys, such as Ti-6Al-4V (the most commonly used titanium alloy in medical devices). To date, no study has evaluated the attachment of fibronectin on Ti-6Al-4V (referred simply as Ti) by the tresyl chloride activation method. Thus, we examined whether human plasma FN can be attached to Ti-6Al-4V via the tresyl chloride activation method and evaluate the effect of the attachment on osteoblast cell adhesion and proliferation

Mobile Radiation Shielding for SWOSU Radiologic Technology Program

Jacob Gonzalez, Cindi Albrightson, Ezgi Gursel, & Brooks Pond

Abstract

Senior capstone students in the Engineering Technology program at SWOSU-Weatherford were tasked with building mobile radiation shields that will allow students in the Radiologic Technology program at SWOSU-Sayre to be protected from scatter radiation during x-ray lab sessions. The students will present their research, design and preliminary sketches for Oklahoma Research Day. The students hope to have all the panels complete and ready to move in to the Radiologic Technology program's new location on the Weatherford campus.

Degradation and Biocompatibility Analysis of a photo-Polymer for DLP Printers

Carlos Palou

Abstract

Digital light processing (DLP) based 3D printers have become popular for higher surface quality and faster processing. However, Printing materials that can be used for biomedical devices in a living body are limited. This poster presents degradation and biocompatibility analysis for Cyanate Ester, a candidate flexible resin material. For degradation experiment, thin circular plates of Cyanate Ester (approximately 1 cm diameter) was cured under UV light exposure and submerged in PBS buffer with pH of 7.5. Plates were weighted before submerging in PBS and then for 2, 4 and 8 weeks. Human dermal fibroblasts cells were cultured with cured cyanate ester plate. Cell performance and interactions with Cyanate Ester plate were evaluated by quantifying various cellular functions such as proliferation, differentiation, and adhesion. Results show that degradation rate is much slower than common biomaterial such as Polyethylene glycol diacrylate (PEGDA) hydrogel. Slower degradation rate may be helpful for certain biomedical application such as bioresorbable stent for cardiovascular diseases. On the other hand, biocompatibility studies show that cell performance in Cyanate Ester was reduced compared to a control group without Cyanate Ester plate. However, more studies are being conducted to verify this finding with other cell lines such as osteoblast cells. These studies can help to expand the applications of DLP 3D printers, especially for biomedical applications.

Design, fabrication and testing of a continuous liquid interface production system

Carlos Palou

Abstract

Continuous Liquid Interface Production (CLIP) has recently emerged as an effective additive manufacturing technology with faster printing speed and superior surface finish. This poster presents in-house design and development of a CLIP system for printing flow diverters. UV light source from a digital light processing (DLP) computer projector was used to initiate polymerization in a vat of liquid photocurable resin-Cynante Ester. A “dead-zone” was created at the surface of the container by creating oxygen-permeable membrane between the container and the resin. It prevents the polymer from curing on the container itself. Mechanical actuation system based on a stepper motor and lead screw was designed in 3D computer modeling and fabricated in UCO mechanical shop. Electrical control unit consists of Raspberry Pi microcontroller, relay switch and various sensors which was designed to project the sliced the computer aided design (CAD) file with NanoDLP. Finally, the assembled CLIP system was tested to print sample cylinders of different sizes. The final goal for the prototype will be to produce parts with sub-millimeter precision. The developed CLIP system will be used to design and fabricate medical grade flow diverters.

HVAC Air Filter Test and Air Behavior Analysis

Natalie Nguyen

Abstract

The effectiveness of an air filter can be quantified by its MERV (minimum efficiency reporting value) rating. The higher the MERV rating, the better the filter is at purifying particles from the air. The MERV rating can be determined by measuring the particle size efficiency, which is the fraction of particles that are captured by an air filter for a given diameter. The purpose of this project is to construct a scale model of HVAC air filter test bench that is compliant with the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) 52.2 and the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) 680. This test bench is used to measure the particle size efficiency. To complete this project, modeling was completed using proprietary software. Calculations were also performed to predict the fluid flow behavior in the air duct. These calculations were based on holding the face velocity of the duct constant between the full-scale model and the scaled down prototype. Computational fluid dynamics (CFD) simulations will also be completed in the future in order to verify the theoretical calculations. The results of the final calculations showed that the total pressure loss through the system to be 7.468 inches of water column and 8.896 inches of water column in the prototype and full-scale model, respectively.

Computational Modeling of the Inner Ear using COMSOL Multiphysics

Scott Mattison & Natalie Nguyen

Abstract

The Center for Hearing and Communication estimates that 48 million Americans suffer from hearing loss. Utilizing finite element analysis and finite difference time domain methods we hope to develop an accurate model of the mechanical and electrical responses of the inner ear to sound stimulation. Developing an accurate simulation of the inner ear's response to sound will enable us to improve long-term outcomes in patients with hearing loss through the development of improved algorithms for existing intervention techniques and provide a powerful platform for evaluating interventions for hearing loss. To accomplish this goal, we have identified published datasets of the mechanical motion of the inner ear in response to pure tone audio signals at various frequencies and decibel levels. Using these initial datasets and anatomical scans of the inner ear, we have begun developing initial models of the motion of the inner ear using COMSOL Multiphysics. COMSOL Multiphysics is a commercially available software that has powerful toolboxes for simulating the complex interactions of fluid motion, tissue motion, and electrical responses that form the inner ear's response to sound. To date, we have developed an initial model of a simplified cochlea in COMSOL that will form the framework for our future work.

Design, Development, and Analysis of Bioresorbable Flow Diverters for Biomedical Applications

Zackary Maggard & Mohammad Hossan

Abstract

Flow diverters (FDs) use fine-meshed tubes to divert blood flow away from the aneurysmal cavity to cure aneurysm and remodel the blood vessel network. However, current FDs are created from woven metal wire and can fail by migration, malposition, or restenosis. This poster presents the design, fabrication, and characterization of a novel bioresorbable fine-meshed FDs based on Polylactic acid (PLA). FDs were designed in 3D computer modeling with SolidWorks. The model was then converted to laser machine-readable code to fabricate control nitinol FDs using a commercial laser machine while PLA FDs were fabricated in fused deposition modeling (FDM). Heat treatment of PLA FDs was conducted to improve mechanical flexibility. Mechanical characterization was conducted by a universal testing machine to evaluate tensile, radial compression and bending profile of both control and PLA FDs. The results show that the mechanical properties of PLA FDs are comparable to the control nitinol FDs. A silicon aneurysm model is being developed using lost wax casting method to study flow characteristics using particle image velocimetry (PIV). The effect of pore sizes, location, size, and orientation of aneurysm cavity on flow patterns and flow-induced parameters such as wall shear stress will be studied. This study will help to develop bioresorbable FDs for aneurysm treatment.

Vertical Michelson-Morley Interferometer

Shynette Porter

Abstract

In our project, we will be discussing the results of the Michelson-Morley-Interferometer experiment in both the horizontal and vertical direction in the Earth's gravitational field. It will be shown if there are any effects of ether, a medium to be thought the cause of propagation of light in air. Our goal would be to visually obtain the data of the continuous fringe movement due to the relative movement of the interferometer, on a screen with a camera. The ending or gradual stop of the continuous fringes during the rotation in the X and Y Axis will lead to a proper explanation of the phenomenon resulting for such results, which we would be observing through this experiment. Our presentation will contain some extensive background information, a proper justification of our model which will be beneficial for both the economic aspect and accuracy of the experiment, and we would show a proper guideline and justification to get the required results that we intend to see.

Detmerminig the Mechanical properties of Fibroblast-Populated Collagen Lattices

Mel Vaughan, Gang Xu, & Joseph Wagner

Abstract

Fibroblast-populated collagen lattices (FPCL) are commonly used as dermal or skin tissue equivalents in order to study the mechanobiological mechanisms behind fibrosis action. This fibrous action playing a role in wound healing and cancer development. More partially these studies develop novel diagnosis for dupuytren's contracture, which is caused by an in increase in biomechanical forces and stiffness of the tissue. This change in fibroblast can create such a great tension that it prevents your fingers from extending. Whereas the only cure for Dupuytren's disease is an invasive surgery with a low success rate or even amputation. Previously these biomechanical properties of FPCL's were determined with a variety of analytical methods. The first method of measuring the tension is to measure the height of the FPCL. The second method is to release these FPCL from the bottom of the dish they are attached to. These methods are great way to compare the effects of two different treatment methods on the FPCL. However, this analysis is analytical rather than numerical and does determine if the FPCL samples being compared have the same biomechanical properties before treatment. In order to determine the biomechanical stiffness of the FBPL an indention method will be used. This measurement process of indentation can be performed with expensive machinery is or a complicated indention process that could potentially damage the tissue. However, these processes are near impossible for

2019 CU Engineering and Applied Mathematics Summer Academy

Dalton Whitehead

Abstract

In the summer of 2019, the Chemistry, Physics, and Engineering department at CU hosted an academy geared towards engineering to help provide High School students an introduction to STEM concepts and provide a hands-on experience. The academy brought 20 High School students, 4 High School Jr. Counselors who participated in the academy in prior years and help guide the new campers providing them with a valuable leadership experience, 4 Counselors who were College students, Dr. Sheila Youngblood who was the Academy Director, and 2 Teachers who are Kyle Holman and Zach Morrison. The summer academy theme was aerospace engineering, where the campers were challenged to design and create a functioning hovercraft while using the engineering design process and over the course of 1 week. Many activities were mixed into the lessons in order to optimize the hands-on experience and add in a bunch of fun!

Histomorphotmetric Analysis Of Skin, Cartilage And Bone Tissue

Priyanka Rao

Abstract

Histomorphometric analysis is the histologic sectioning of normal and diseased samples, such as healing wounds and fractures, which is known to be widely used in research. However, over previous decades, certain techniques and analysis have not been recognized in a long time causing them to lack in solutions that they are looking for. Therefore, the results have recently become more feasible with the development of digital whole slide imaging and computerized image analysis systems that can interact with digital slides. This technique is used for various applications mainly skin, cartilage and bone respectively. One of the aims of this project is to develop a skin graft model that can mimic the structure and function of the dermis by using Electrospun Nano fiber coating to depict collagen, polyethylene Glycol Diacrylate(PEGDA) and poly e-caprolactone (PCL) scaffolds which were cultured using rat dermal fibroblast cells. By depicting with these materials, the results show that histomorphometric evaluation quantifies the shape, size and number of cells present as well as other morphological operations. This technique also displays various features within the cartilage respectively. Furthermore, the similar analysis will be applied on the bone where electro spun nanofiber coating techniques were used to improve the mechanical and biological functions of titanium implant.

Probing Tension Generation in the Portable Engineered Dermal-Equivalent Tissue

Erin Drewke, Gang Xu, Abasi-ama Udeme, & Mel Vaughan

Abstract

The purpose of this study is to probe and quantify the mechanical tension generated in the fibroblast-populated collagen lattices treated with a growth factor. In this study, we created tension-maintaining dermal equivalents by co-culturing human dermal fibroblasts with type-I collagens with the addition of transformative growth factor Beta.

Polymerized collagen lattices were supported structurally by plastic mesh rings. TGF-Beta was added to half of the lattices to study its effects on tension generation. The cultures were incubated in a CO₂ incubator for 7 days to allow the lattices to develop. After incubation, the generated mechanical tension in these dermal equivalents was probed by removing a small circular section (2-mm in diameter) from the tissue with a biopsy punch. The expansions of these induced wounds were recorded and measured at various time points. The induced wounds in TGF-Beta treated lattices showed quicker and larger expansion than the control, which indicates that the fibroblasts had more tension generated in the presence of TGF-Beta.

Peer Mentor

Support Systems for First Year Engineering Students

Dalton Whitehead

Abstract

An engineering program in southwest Oklahoma is growing exponentially and the department needs to capitalize on that growth in order to sustain it. In Oklahoma there is an expected 15.4% growth in architecture and engineering careers from 2008 to 2018 according to The Oklahoma Employment Security Commission, Economic Research and Analysis Division [1]. Regional university engineering programs serve as pipeline programs for students in rural areas to attain degrees and secure job placement in the growing STEM career opportunities in Oklahoma. This university's engineering program offers five engineering disciplines for an AAS in Engineering: Mechanical, Industrial, Electrical, Civil and Environmental. This program began in 2014 and has had 24 graduates to date. The program's ability to retain students past the first year is essential. The course load is heavy with approximately 18 hours per semester expected for a student to stay on track in the program. The Engineering Program utilizes peer support systems in the first year engineering program. First year engineering students experience ENGR 1411 (Introduction to Engineering) and ENGR 2113(Statics). The development of the Engineering Learning Laboratory for Statics allows upperclassmen to mentor and support first year engineering students.

Peer Mentor Support Systems for First Year Engineering Students

Victoria Due

Abstract

An engineering program in southwest Oklahoma is growing exponentially and the department needs to capitalize on that growth in order to sustain it. In Oklahoma there is an expected 15.4% growth in architecture and engineering careers from 2008 to 2018 according to The Oklahoma Employment Security Commission, Economic Research and Analysis Division [1]. Regional university engineering programs serve as pipeline programs for students in rural areas to attain degrees and secure job placement in the growing STEM career opportunities in Oklahoma. This university's engineering program offers five engineering disciplines for an AAS in Engineering: Mechanical, Industrial, Electrical, Civil and Environmental. This program began in 2014 and has had 24 graduates to date. The program's ability to retain students past the first year is essential. The course load is heavy with approximately 18 hours per semester expected for a student to stay on track in the program. The Engineering Program utilizes peer mentor support systems in the first year engineering program. First year engineering students experience ENGR 1411 (Introduction to Engineering) and ENGR 2113(Statics). The development of the Engineering Learning Laboratory for Statics allows upperclassmen to mentor and support first year engineering students.

Light-Weight Walker Frame for Elderly and Injured People

Sabin Kapali

Abstract

More than 1.5 million people in the United States alone, use walker frames to improve their mobility. Unfortunately, despite its clinical success with older adults and patients with various chronic conditions, the walker may, in certain situations, interfere with one's ability to maintain balance, leading to severe fall-related injuries and pain. Furthermore, repetitive stresses on the upper-extremity joints owing to extended or improper use of the walker, may increase the risk for tendonitis, osteoarthritis, and carpal tunnel syndrome. More particularly, patients with arthritis, are at high risk of developing joint inflammation. Studies showed that 30% to 50% of people abandon using the walker soon after receiving it, mostly because it was "difficult and/or risky to use". All-inclusive, the search for a lightweight walker frame that can simultaneously ease patient mobility without the risk of injury and joint pain is still on the lookout, and the design features proposed in the current project may be a better alternative.

Development and Visualization of Nonhomogenous Tension Generation in Engineered Tissue

Anna McCoy, Gang Xu, & Mel Vaughan

Abstract

Fibroblasts are cells in connective tissue which produce and reorganize the extracellular collagen matrix. The fibroblast-populated collagen lattices have been a common tissue model for studying wound healing, fibrosis and cancer progression. The goal for this research project is to engineer and characterize a special type of collagen lattices. The mechanical tension and reorganization created by the fibroblast would develop primarily in the lower half of the anchored lattices. The approach was to measure the reorganization and compaction of the collagen matrix by optical coherence tomography (OCT) every day. In addition, tension generation was probed by releasing the collagen matrix from the attachment with the substrate and measuring ensuring contraction. Our preliminary results showed that mechanical and morphological changes of developing tissue depend strongly on the initial distribution of cells. Studying the biomechanics of simple tissue models will be an important step in understanding the normal and pathological development of native tissues.

Evaluate the Effect of Electric Field on Osteoblast Cells

Naveen Thirunilath & Mohammad Hossan

Abstract

Electric field is one of the major actuation mechanism in microfluidic devices for cell manipulations and cellular analysis. However the impact of electric field on cells and their cellular functions or the safe range of electric field for various microfluidic applications are not established yet. The goal of this project is to analyze the impact of electric field on osteoblasts cells and suggest a safe range of electric field for electric field guided manipulation of cells. Common microchannel designs from literature such as sharp and smooth constriction region, convergent-divergent region, serpentine regions, obstacles of circular, rectangular and diamond shape in the channels were fabricated using standard photolithography techniques. The microchannels were filled with mouse osteoblast cells and the DC electric potentials of different magnitude and time were applied. After the exposure of electricity, the cells are collected from the chamber and counted the live and dead cells using cytometer. The live cells were then cultured back and staining after 48 hours to evaluate proliferation and differentiation. The results show that exposure time and channel design does have negative impact on the cell functions even with otherwise safe electric field limit. In general, up to 300 V in a typical microchannel does not have adverse effect on cells. This study will help to better design of microfluidic devices for cell manipulation without compromising their cellular performance.

Automated Adjustable Temperature Mattress

Craighton Hale

Abstract

We set out to design a mattress that will cool and heat the user by creating a mattress that would have these systems built in. Sleep temperature is a leading factor in sleep quality. We want to solve this issue and offer a higher quality of sleep by adjusting the temperature of the mattress.

In order to design a mattress capable of adjusting the temperature of itself we have divided the project into three sections; Mattress Heater System (MHS), Mattress Cooling System (MCS), and Temperature Control System (TCS). The MHS will be a combination of mechanical and electrical systems which will heat a wire to a desired temperature. The MCS will be a combination of mechanical and electrical systems which will deliver airflow through a grid of pipes that will lay within the mattress. The MCS will be divided into two further sections; Air Delivery (MCS/AD) and Air Cooling (MCS/AC). The TCS will be the controller which will incorporate an MCU, sensors, and user inputs in order to produce the desired result for the user.

There are a few competitors in the field of adjustable temperature mattresses, of which seem to offer the same style of heating and cooling; hydro-based water circulation. We aim to offer the same heating and cooling options; however, we will be using different approaches. What we hope to improve on is the ability to offer air flow, make it less expensive, and reduce the need for regular maintenance.

Finite Element Analysis of a Blast Induced Head Injury

Mohammad Hossan & Rahul Sridhar

Abstract

Traumatic brain injury is one of the common injuries in US for football players, military personnel and road accident survivors. The aim of the research is to study the response of cerebral fluids and how the blast wave propagates when a sudden impact happens. A finite element model of the brain injury has been prepared and will be tested under various conditions using ANSYS and LS Dyna. Initial design was developed with a closed cylinder hit by a foreign object. Material properties were defined based on the bone, tissue properties from literature. The impact velocity is set to be 10m/s which is typically a real-life scenario and has been also verified with previous models. The simulation provides the pressure changes in the different segment of the brain and location of stress concentrations. Currently a more rigorous model is being developed based on Human brain with the skull images from MRI and CT scans. This rigorous model will help to better understand blast induced cavitation formation and related injuries.

Microwave Imaging System

Nathaniel Ashley & Kyle Espinosa

Abstract

Microwave Imaging System

In the field of diagnostic medicine, there are many methods to visualize disease pathology in the body. The prevalent method of medical imaging techniques relies on ionizing radiation, which is harmful to patients on a cellular level. As more imaging tests are performed, safer alternatives must be developed to protect the public from these harmful effects. The design of a Microwave Imaging (MWI) system is a novel solution that will produce images while keeping the patient safe from harmful radiation. Lower frequency microwaves are not as harmful to DNA and cellular structures. As a result, a low-powered MWI system would be a safer method to acquire diagnostic medical images. Although this technology has been actively researched for several decades, the proposed system design differs in that it will attempt to merge the circular data collection patterns of computed tomography and magnetic resonance imaging with the backscattered signal processing of radar and ultrasound. Consequently, the system would be able to produce three-dimensional diagnostic medical images by safer means than currently used conventional imaging methods.

Rocketry: Taking The SWOSU Physics Club to New Heights

Daniel Gassen, Wayne Trail, & Cameron Cinnamon

Abstract

Since 2017, the Kloudbusters Rocketry Club in Argonia, Kansas has put on a rocketry competition open to Colleges and Universities. The goal is to fly a rocket to a minimum of 8000 feet and safely return the rocket to the ground, and its payload, a golf ball, to a specified location near the launch site. In order to reach 8000 feet, competition rockets need to reach speeds near or above the speed of sound, 770 miles per hour, within about two seconds after launch. The stresses and forces to reach these speeds make precision in design and construction critical. We are aided in the design phase by an open source program called Open Rocket, which allows us to simulate flights with various rockets and engines. In-flight parameters like velocity, acceleration, altitude, orientation, and GPS location are handled by on-board microcontrollers we have either purchased, or designed, built, and programmed. The design and testing of the payload delivery system is also challenging. We have multiple ideas for payload delivery including a drone, glider, a parasail, and controlled fall capsule.

Building and Programming an Arduino Based Quadcopter

Daniel Gassen

Abstract

We have designed and built a quad-copter drone with an Arduino microcontroller as the flight-controller. For various projects the SWOSU Physics Club has needed a drone for aerial photography and other purposes. Rather than purchase one, we decided to build one based on the designs and software of Joop Brokking. Our first attempt is a self-leveling drone that weighs about 2.7 lbs. (including the battery), is about 24 inches on a side and stands 10 inches tall. The next phase of the project is to incorporate GPS and video that transmits to the ground.

Electronic Aspirin : Could it Potentially Become a Permanent Solution for Migraine?

Lisa Boye & Alzahra Alshabrakah

Abstract

According to Energies Market Research, migraine is the third prevalent neurological illness affecting approximately 39 million people in the U.S, and one billion people across the globe, which led to the innovation of the Electronic Aspirin, a faster and more effective way to relief migraine. In their poster presentation, Alzahra Alshabrakah from Saudi Arabia and Lisa R. Boye from Liberia will explain what the Electronic Aspirin is, how beneficial it can be for patients who suffer from migraine, and how It differs from other over the counter medications such as regular Aspirin.

Heating Cooling and Air Conditioning(HVAC) Machine Learning Prognosis Tool

Josiah Lok Teck Tie & Sharveen Rajaindran

Abstract

The project that we chose to carry out is the HVAC machine learning prognosis tool. Our main goal in the project is to research and create machine learning algorithms to be able to detect the error that is occurring with the geothermal HVAC unit and to determine a way to predict failure in the system before it occurs. The problem that we are trying to solve is the issue of failures in the HVAC unit which can be caused by many different issues. Solving this issue enables a lot of money to be saved and the shelf life of the unit to be extended. Besides that, it is also reduces man power and saves time as no technician will be needed to go to the area of interest and try to figure out what the issue is. Our plan to solve this issue is by carrying out data analysis, and coming up with a machine learning algorithm that will be able to read the real time data of the HVAC unit and is able to predict potential failure before it occurs so that the necessary precautionary measures can be taken. This solution is much beneficial than any other ones because it is cheaper and faster for the user to detect potential failure. We have to date successfully managed to design an algorithm that can accurately predict the outcomes through regression analysis and are currently working on creating a classification model and are currently trying to piece them together so that we can upload them to the cloud.

A Novel Method in Testing Gyroscopes Used in the E-4B

Phu Dang

Abstract

Gyroscopes are widely implemented in aerospace applications. Due to the law of conservation of momentum, gyroscopes serve as a reference point in three-dimensional space. Gyroscopes are required to be tested at regular intervals for airworthiness. Currently, Boeing's E-4B Systems Integration Lab (SIL) test their gyroscopes by rotating the gyroscope manually. A rotating gyroscope will produce a pickoff signal that can be measured by an oscilloscope. Due to the current testing procedure which requires extensive human intervention, Boeing requested a development of a new method for testing their gyroscopes. Currently, our solution consists of a belt and a pulley system that is driven by a NEMA 23 motor. The motor will be controlled by a Raspberry Pi, and the user will input appropriate commands through a touch screen. We believe that by creating an automated apparatus, human errors could substantially be reduced compared to the current procedure. We have successfully modeled our apparatus in SolidWorks; several components are being constructed using available 3-D printer technology. We have implemented a rotary encoder to relay information such as rotational rate and angle of rotation. Future work includes assembly of the apparatus to be a cohesive unit and begin testing gyroscopes.

Quantifying the Mechanical Motion of the Inner Ear using Optical Coherence Vibrometry

Scott Mattison

Abstract

The cochlea is a small, snail shell like, part of the inner ear responsible for the transduction of mechanical sound pressure into electrical stimulation in the brain. Despite the importance of the cochlea for normal hearing, the mechanical interactions between various components is not well understood. By utilizing a technique known as optical coherence vibrometry we hope to quantify the changes in mechanical motion of the embryonic avian cochlear duct. By observing changes in the response of the cochlea as key regions of the cochlea develop we hope to determine the role each of these components play in healthy hearing. To quantify the mechanical motion of the cochlea we expose the cochlea to pure tone auditory stimuli at various sound pressure levels and frequency. We record the amplitude and phase of the mechanical response key structures in the cochlea and compare them across developmental stages.

Effects of Fertilizer on Cow Pasture

Alexandra Lopez

Abstract

One of the biggest contributors to greenhouse gases is livestock, and cows make up most of that percentage. To try to reduce emissions, Low Carbon Beef LLC (LCB) has developed protocols to contribute to a more sustainable beef industry. By conducting their own research, LCB can improve their low-carbon methods. Because soil carbon sequestration has a big impact on the overall lifecycle emissions from cattle, the objective of this experiment was to record the effects of fertilizer on the soil. Two similar 10' x 10' plots of land were chosen. One plot was fertilized, while the other was left untouched. After a month, one cow and one calf were placed in the fertilized plot for four hours; which is a grazing period equivalent to that in a typical pasture (5 acres per cow per year). Soil samples were collected four times: 1) before the experiment, 2) 7 days after fertilizing, 3) 7 weeks after fertilizing, and 4) 12 weeks after fertilizing. All samples were analyzed by the Oklahoma State University Extension Office for pH, nitrate, phosphorus, potassium, organic matter percentage, and total nitrogen percentage. The fertilized plot showed an 18% increase in organic carbon, a 12% increase in total nitrogen, a 51% increase in phosphorus, a 23% increase in potassium, and a 3% increase on pH after the 12 weeks. The control had no increase in organic carbon, total nitrogen, or in phosphorus after 12 weeks, but there was a 13% increase in potassium and a 3% increase in pH. As

Health Impacts of Air Pollutants: Particulate Matter

Brandon Blankenship

Abstract

The purpose of this study was to look at the connection of particulate matter (2.5 and 10 ppm) and how it affects the human body. Also, I looked at what adverse effects and complications could arise. Particulate matter is a mixture of the solid particles and liquid droplets found suspended in the air. Once our body is exposed and inhaled, if the PM is 2.5 or 10 ppm in size this is when it could be dangerous if inhaled, once inhaled it has the potential to enter the bloodstream. The elevated ozone levels have been closely related to an increase in hospitalizations, emergency room visits, and premature death. In the research, I have also found that some of the particulate matter is carcinogenic and can pose a huge threat to immunocompromised patients. The Ambient air pollution posed greater threats and was linked to the presence of PM. The elderly and the children were the focus of the community. This is where I saw most of the adverse health effects.

A Look at Water Use and Agriculture in Oklahoma: Toward a Sustainable Future

Hanna Vranesevich

Abstract

While landlocked states such as Oklahoma appear to be far removed from national and global water systems tied to rivers, lakes, and oceans, runoff from commercial agricultural practices can have detrimental effects on the ecosystems of groundwater and river systems which can ultimately disrupt larger bodies of water such as the Gulf of Mexico (Smits 2019). The continuous struggle to find an equilibrium between the potentially damaging effects of mismanaged agriculturally based commercial operations and the need for such operations have resulted in lawsuits that have reached the U.S. Supreme Court. The decision reached in *Arkansas v. Oklahoma* of 1992, upstream states were ordered to adhere to the water quality standards of downstream states, yet regulatory bodies like the Environmental Protection Agency are still evaluating this monumental case (Seitzinger 2017). While this presentation emphasizes the economic impairments that arise from this issue, it also focuses on the ecological damage that occurs. When common organic agricultural outputs such as nitrogen and phosphorus enter water sources, oxygen is depleted through a process called eutrophication which makes it almost impossible for life to survive (Monteagudo 2012). The development of sustainable measures to maintain clean and healthy waters is vital for the continued protection of this invaluable resource.

Impact of Stream Unit Type and Upstream/Downstream Location on Litter Accumulation in Small Urban Waterways

Breanne Thomas, Dr. Emily Hendryx, Dr. Matthew Parks, & Kim Hwa Lee

Abstract

Litter is recognized as the improper disposal of trash, leading to impacts on the environment and public health. The main goal of this research is to inform litter remediation efforts for urban waterways in the Oklahoma City metropolitan area. We collected litter accumulation data from multiple transects within riffle, run and pool stream units along four urban creek sites. Litter counts and surface area coverage along streams were recorded from digital point-transect images taken on-site; litter counts were also recorded through visual-transect counts. Field data was summarized using ANOVA statistical methods, contrasting the effects of stream unit type and upstream/downstream locations on litter distributions. These results will enable more efficient litter mitigation efforts, including placement of litter funnel traps and community stream cleanup events.

Correlating Litter Accumulation and Development in Small Oklahoma City Urban Waterways

Breanne Thomas, Kim Hwa Lee, Dr. Andrew Taylor, Dr. Matthew Parks, & Dr. Emily Hendryx

Abstract

Accumulation of litter in local and regional watersheds has global consequences, including contributing to decreased quality of freshwater resources and oceanic ‘garbage patches’. In this study, we surveyed several streams in Oklahoma City in different types of urban areas to determine the correlation between litter amounts and level and type of adjacent development. We predict that areas that are more commercialized will have more litter than areas that are not as developed. We surveyed four stream sites: heavily commercialized, medium commercialized, light commercialized, and residential. At each site, we determined run, riffle, and pool stream units and took litter count and surface area measurements along three point-transects within each unit type. Along each transect, we took digital images of 1 m diameter, regularly-spaced points spanning the stream channel and adjacent floodplain. Point-transect measurements were supplemented with visual counts along one transect per stream unit type. Data was summarized using ANOVA-based statistical methods, contrasting levels of development with litter accumulation, and accounting for differences in stream unit type. Correlation between the level of development and litter accumulation could inform remediation efforts, identify critical litter point sources and help establish more effective regulatory measures for future development.

Concentration of Trash Along Small Streams at a Fixed Point in Time

Noah Holt, Dr. Matthew Parks, Ashton Johnson, & Dr. Emily Hendryx

Abstract

Accumulation of trash in small watersheds can negatively impact both terrestrial and aquatic ecosystems. The inappropriate disposal of consumables is a longstanding issue with significant influence on environments all around the world. The goal of this study is to mathematically model how trash deposited into small streams collects and spreads along the body of water. We collected litter accumulation data using point-transect methods along four sites in small urban streams in the Oklahoma City metropolitan area. By employing a steady-state convection-diffusion equation, we model trash distribution with respect to stream properties over a distance. Our model demonstrates the relationship between the most common types of segments in small waterways and the concentration and rates of diffusion of trash. Project results leverage underlying processes driving litter accumulation in small waterways, and will inform future modeling efforts for both urban and rural watersheds.

A Differential Equations Model of Litter Movement Along a Stream Over Time

Dr. Andrew Taylor, Noah Holt, Ashton Johnson, Dr. Emily Hendryx, & Dr. Matthew Parks

Abstract

Litter accumulation in urban waterways in central Oklahoma negatively affects our local ecosystems. We collected data by the use of point-transect sampling at multiple stream sites in the Oklahoma City metropolitan area consisting of the standard riffle, run, and pool stream units. The goal of our research is to model the amount of trash on both land and water in a given stream unit with respect to time through the use of a system of first order linear differential equations. The specific parameters of our mathematical model are derived from statistical analysis of our data for each unit, describing trash movement between land and water as well as from unit to unit. Our research provides preliminary results for predicting litter collection in similar streams based on our general mathematical framework and coupled with specific parameters derived from stream data. Such models allow us to study litter dynamics under different stream properties and varying litter inputs over time.

Evaluating Methods of Quantifying Stream Litter Accumulation in Urban Streams

Brock Archer & Alfonzo Cole

Abstract

Litter accumulation in stream systems is a local problem with global significance, as local sources contribute to the growing mass of litter contaminating our waterways and oceans. The objective of this research was to evaluate three different strategies of quantifying litter accumulation in streams. We visited four sites along streams within the Oklahoma City metropolitan area and recorded three different measurements of litter accumulation: point-transect count, point-transect surface area, and rapid visual-transect count. For each site, we delineated three-stream unit types (riffle, run, and pool) and ran three point-transects perpendiculars to streamflow within each unit type. Each point-transect included five proportionally-spaced 1-m-diameter plots within the stream channel, as well as one plot on the floodplain of each bank. This was different from the rapid visual-transect count conducted once per stream unit type, in which individuals were timed and counted litter visually along a straight transect. We hypothesized that each method would capture elements of litter accumulation in streams effectively, but that each method may have unique biases. Therefore, we compared the three measures across our sampling sites by graphing and correlation analyses. The differences between these methods can provide insight regarding the appropriateness of each measure for quantifying litter accumulation in streams, informing future clean-up efforts in urban watersheds.

Enzymatic Digestion of Pseudogenes for Species Identification

Billi Bobala & Kaitlyn Hickey

Abstract

It is important for wildlife forensics scientists to genetically identify animal species when analyzing a poached artifact to preserve endangered animals and prevent poaching. This genetic identification yields solid evidence when apprehending criminals. A common problem when performing DNA analysis on wildlife is that mtDNA used for identification is often found as pseudogenes in the nuclear DNA. These numts can make it difficult to correctly identify species involved in wildlife crimes. It is currently commonplace to dilute a sample to only sequence mtDNA. Due to the amount of mtDNA in every cell, this should theoretically eliminate some numt contamination. However, with a sample containing a low quantity of DNA, there's a risk of over dilution and loss of sample. Exonuclease V is an enzyme that will digest linear DNA and leave only circular DNA. Mitochondrial primers were designed to amplify *Panthera* cyt b. Nuclear primers for the β -fibrinogen intron 7 gene were used to identify linear DNA and confirm its digestion. Exonuclease V digested the numt, leaving only the uncontaminated mtDNA. Exonuclease V's effectiveness was confirmed by running gel electrophoresis with the mitochondrial primers and nuclear primers to show the absence of amplified nuclear DNA and presence of amplified mtDNA. This was further supported by the absence of nucleotide variations within the sequenced mtDNA.

An Analysis of the STEM Career Builder Program and STEM Interests Among High School Girls

Joselina Cheng & Kathleen Brown

Abstract

This program was developed to increase STEM awareness among high school girls - specifically those who have limited access to STEM education. As a part of this initiative, students are specifically recruited from the Oklahoma Promise Zone. We were awarded a grant by the National Science Foundation to allow the modification of our current summer STEM academy to focus exclusively on females and computer forensics. The grant also allowed a new initiative to be formed: recruiting high school STEM teachers to facilitate our summer academy. For our program, we use a variety of techniques including e-learning, hands-on experience, virtual reality, computer simulations, subject-matter experts, internships, fellowships, and more to provide girls with an overview of computer forensics and career possibilities. Students have the opportunity to tour law enforcement facilities and work a mock case to get a glimpse of the possibilities in forensic science. Our study looked at five research questions to measure the lasting benefits of the program. Pre- and post- surveys were given to students and teachers to measure program efficacy. As a result of the 2019 summer academy, both teachers and students reported increases in STEM career awareness, and students reported an increased interest in pursuing a four-year STEM degree. Moving forward, the academy will be modified slightly for maximum effectiveness, and former attendees will be selected for STEM internships and fellowships.

Difference in Coding Sequence Between Bats and Humans in DNA Repair Gene Rad50

Erin Reynolds

Abstract

Of the 19 species of mammals that live longer than humans relative to their body size, 18 are bats. Thus, bats are optimal organisms for research concerning age-related diseases and cancer. We investigated differences between the nucleotide and amino acid sequence of the RAD50 gene in bats and humans. Rad50 protein is known to play a role in the repair of double-strand DNA breaks (DSB). When left unrepaired, DSBs lead to loss of genetic information, cell death, mutations, or uncontrolled division. We took skin samples from the wings of three bat species (*Myotis velifer*, *Tadarida brasiliensis*, and *Eptesicus fuscus*). The RNA was separated, converted to cDNA, and the RAD50 gene was isolated using PCR and gel electrophoresis. We obtained 1550 base pairs of DNA sequence representing approximately 1/5 of the coding length. Our results revealed 108 (19.6%) differences in nucleotides among the various bat species and humans with 34 (6.5%) resulting in an amino acid change. Of those variances, 55 (3.5%) were unique to humans, which altered 19 (3.6%) amino acids. The presence of differences in nucleotide and amino acid sequence in the RAD50 gene between bats and humans was confirmed in this study. However, this gene was found to not be under positive selection. This is a preliminary study that provides direction for future research concerning the role of RAD50 in the DSB repair pathway in bats.

Unraveling the Role of Nardilysin in Heart Function and Development

David Seo

Abstract

Nardilysin (NRDC) is a protein localized in the mitochondria. Loss of *Drosophila* *Nrdc* (*dNrdc*) causes developmental defects and neurodegeneration. Human patients carrying loss-of-function variants in NRDC exhibit developmental delay and neurological manifestation. NRDC is highly expressed in neurons, but also hearts. The role of NRDC in hearts, however, has not been defined. The goal of this study is to determine whether heart-specific loss of *dNrdc* exhibits heart defects in development and adult stages in fruit flies. An RNA interference (RNAi) strategy and heart-specific Gal4 driver (*Hand-Gal4*) were utilized to reduce *dNrdc* expression in *Drosophila* heart at two expression conditions: 25°C (moderate expression) and 30°C (higher expression). To determine *dNrdc* knockdown effects on development, we scored fly death during development. To assess *dNrdc* knockdown effects on adult heart function, we scored how many adult flies exhibit wing heart defects: flies with abnormal wing morphology. Our studies show that heart-specific *dNrdc* knockdown causes developmental defects and a wing-heart defect in fruit flies. Both developmental and wing heart phenotypes were more significant at 30°C compared to 25°C, suggesting that deficiency of *dNrdc* lead to the phenotypes. This is the first study to demonstrate the effects of *dNrdc* knockdown in *Drosophila* on heart function and development, and it shows that *dNrdc* is required for normal development and adult heart function.

Adipose-specific expression of microRNAs regulate body fat in fruit flies

Jin Seo

Abstract

Obesity is one of the fastest- growing epidemics across the globe and is responsible for various obesity- related diseases such as diabetes and cardiovascular diseases. MicroRNAs (miRNAs) are small non-coding RNAs that have an important role in gene expression. In previous studies, we screened 160 miRNA mutant lines of *Drosophila melanogaster* and identified 46 miRNAs which regulate body fat. Here, we tested whether the 46 miRNAs regulate body fat in an adipose tissue- specific manner. Using the Gal4/UAS binary gene expression system, which contains adipose tissue specific- Gal4 and Upstream Activating Sequence (UAS)-miRNAs, we overexpressed the miRNAs and measured their body fat contents by quantitation of triglyceride. We have identified adipose-specific expression of multiple miRNAs altered body fat in fruit flies. Considering the conserved genes between fruit flies and humans, our findings could help treat obesity, diabetes, and other obesity-related diseases.

Optimizing 16s and 18s rRNA metabarcoding of microbial communities colonizing freshwater turtle shells

Cameron Kedy & Dr. Matthew Parks

Abstract

Metabarcoding is a DNA sequencing strategy enabling taxonomic dissection of complex microbial communities, with microorganisms identified through informative DNA sequences rather than by morphology. Our project seeks to apply DNA metabarcoding techniques to characterize microbial diversity present on the shells of freshwater turtle species across aquatic environments in Oklahoma. During summer 2019, 30 *Trachemys scripta* and one *Pseudemys concinna* turtles were trapped across diverse aquatic sites primarily in central and southeast Oklahoma. Shell scrapings were taken from eight top and bottom scutes of each turtle, and from submerged substrates at each site. DNA was extracted from scrape samples using a two-filter protocol; resulting DNA concentrations ranged from 0 to 361 ng/ μ L (avg=48.7 \pm 73.4). We are now applying a two-step PCR protocol to selected DNA extractions. In PCR1, hypervariable regions of 16s and 18s rRNA loci are amplified with fusion primers containing sequence complementary to conserved flanking regions and in-line sample-specific indices. In PCR2, PCR1 product is amplified to further incorporate Illumina sequencing motifs. Modifications to amplification procedures have improved amplification success from ca. 50-75% to 100% on sample subsets for 16s and 18s PCR1 amplifications. Amplifications have now proceeded to a bulk (96-well plate) format, with Illumina sequencing and bioinformatic analysis using the QIIME platform planned for late spring 2020.

Genetic Investigation of the Impact of Single Nucleotide Polymorphism (SNP) on Caffeine Metabolism

Muatasem Ubeidat

Abstract

SNPs are single base-pair mutations in a particular region of DNA. In the human genome, SNPs appear approximately every 300 bases on average. If the human genome is 3.1 billion bases, that means there are approximately 10 million SNPs! Because SNPs can occur anywhere in the genome, they can have dramatic effects on protein expression and function or no effect at all. Caffeine is a widely used drug by 90% of the world population on a daily basis with 150 million regular coffee drinkers in the United States alone. Coffee consumption is beneficial. It makes us energized in the morning and showed linked to a decreased risk of type 2 diabetes, Parkinson's and Alzheimer's diseases, and tea drinking has been linked to a lower risk for some cancers. Too much caffeine can also have negative effects. Some people become jittery after drinking a single cup of coffee, while others can drink several cups of strong coffee Part of that variability and not wake up a bit. Is it genetics? Is it adaptation to caffeine? We know caffeine is primarily metabolized by the liver enzyme cytochrome P450 1A2 (CYP1A2). Our goal is to produce a PCR product for accurate sequencing of the targeted sequence in the small population. An accurate single Nucleotide Polymorphisms (SNPs) for each subject will be achieved. We will be looking for a SNP in an intron of DNA for CYP1A2. This SNP (rs762551) has been linked to how fast CYP1A2 metabolizes caffeine in those of each ethnic group.

Comparing the Effects on Power During an Aquatic and Land Plyometric Intervention

Landon Jackson

Abstract

Introduction. Plyometric training is a tool used to improve athletic performance for individuals who practice the skill in a fitness program, such as movements for vertical and horizontal jumping power, strength, agility, speed, and coordination. **Purpose.** The purpose of this research study is to compare the effects of aquatic and land plyometric training programs on power, body composition, and enjoyment. **Methods.** Participants will be recruited at Mercy Fitness Center-Edmond I-35 and at the University of Central Oklahoma. Requirements for the study are participants ages 18-40, free from lower body injuries for the past year, have no exercise limitations, and be performing resistance training at least twice a week for the past 12 months. Pre and post testing measurements will be taken for height, weight, age, vertical jump height, and body fat percentage. Participants will be randomly selected into either an aquatic or land training group, and then will train twice a week in the environment selected for eight weeks. **Conclusions.** The researcher found both sides to be effective methods of increasing athletic performance, but the findings were not consistent across the board. The length of participation, volume, impact forces, and muscle soreness were factors that affected the results. The researcher plans to focus on equal amounts of volume, participation length, and using both kinds of training styles to compare the effects and to find a better method of plyometric training.

Text classification via network topology: A case study on the Holy Quran

Esra Akbas & Mehmet Aktas

Abstract

Due to the growth in the number of texts and documents available online, machine learning based text classification systems are getting more popular recently. Feature extraction, converting unstructured text into a structured feature space, is one of the essential tasks for text classification. In this project, we propose a novel feature extraction approach for text classification using the network representation of text, network topology, and machine learning techniques. We present experimental results on classifying the Holy Quran chapters based on the place each chapter was revealed to illustrate the effectiveness of the approach.

Multiple Positive Solutions for a Sixth Order Nonhomogeneous Boundary Value Problem

Stephanie Walker & Britney Hopkins

Abstract

This poster spotlights a process for determining the existence of at least three positive solutions for a particular class of sixth order nonhomogeneous boundary value problems on a discrete domain using Fixed Point Theory. The method takes advantage of reducing the sixth order difference equation into a system of simpler second order equations and then transforming this new system so that it is subject to homogeneous boundary conditions. We then create a specific operator and cone that meet the criteria of the Guo-Krasnosel'skii Fixed Point Theorem. This allows us to apply the theorem multiple times, guaranteeing a minimum of at least three distinct solutions. As a result, we conclude that although solutions to this type of boundary value problem exist, they are not unique.

Diffusion Frechet Function and its Application in Classifying ECG

Dr. Emily Hendryx, Mehmet Aktas, & Uyen-Minh Le

Abstract

The Diffusion Frechet Function (DFF) has demonstrated stability in capturing network features. Nodes with lower DFF values play essential roles in the whole network. In this poster, we implement this core idea into a process of classifying electrocardiogram (ECG) data. Each person's ECG is transformed into a network in which the DFF method is applied to capture the network's attributes. The random forest algorithm is then used as a classification tool to classify healthy and sick people's ECGs. This poster presents the results of this novel DFF application to ECG network classification.

Mathematical Model of Moose Vehicle Collisions in Anchorage

Alexandra Milliken

Abstract

Moose-vehicle collisions (MVCs) are a dangerous part of life in Anchorage, Alaska. Almost one quarter of all MVCs result in injury to a vehicle occupant, and approximately 120 moose are killed in Anchorage each year by MVCs. With the human population in Anchorage growing, the number of registered vehicles will also grow. We create a mathematical model of the effect of snow depth on moose population and MVCs in order to help Anchorage officials predict when the risk of MVCs will be high. We assume that moose can decrease in population by MVCs, snow depth (starvation), natural death, hunting, and migration out of the Anchorage area. Birth rate and migration into the area are the only way the moose population can increase. We develop a differential equations model based on these assumptions and use a combination of analytical and numerical techniques to solve the model. We analyze results from the model to suggest ways to reduce MVCs in Anchorage.

Modeling Measles Vaccination and Outbreak

Amber Young

Abstract

Measles is a highly contagious infectious disease with symptoms such as cough, fever, and a characteristic rash, with the possibility of more severe complications such as pneumonia, brain damage, deafness, and even death. Although measles was declared eliminated from the United States in 2000, there are over 1,000 cases this year alone. This research aims to use mathematics to better understand the transmission of measles. Differential equations are used to model the transmission of measles in a population. Model variables include susceptible, vaccinated, infectious, and recovered individuals. The model is solved numerically, producing plots of the variables as functions of time. Steady state and bifurcation analysis are used to provide more insight into the effect two model parameters (the rate of vaccination and the rate of infection) have on the number of individuals with measles. This set of differential equations can be used to determine the fraction of the population that needs to be vaccinated to achieve herd immunity and prevent the spread of measles in a population. The cost of a measles outbreak is also modeled, and results are presented for both open and closed populations.

Developments in the semi-local convergence of Newton's method

Yauheniya Shviadok

Abstract

Newton's method is a very effective tool for generating a sequence approximating a locally unique solution of a nonlinear equation involving Banach space valued operators under some conditions on the initial data. We present the developments of the semi-local convergence of Newton's method starting from the famous Kantorovich criterion for solving nonlinear equations. It turns out that this criterion can be weakened leading to a wider convergence region, tighter error bounds on the distances involved and a more precise location of the solution. These advantages are obtained under the same Lipschitz conditions as before. Hence, the applicability of Newton's method is extended in cases not covered before.

Investigating Mathematical Aspects of Gerrymandering: Compactness vs. Regularity

Liz Lane-Harvard, Ph.D., Lawrence Dongilli IV, & Thomas Milligan, Ph.D.

Abstract

Legal precedent concerning the identification of gerrymandering has drawn considerable attention to the use of geometric compactness as a measure of district quality. However, we contend that geometric regularity may be a better metric for this purpose than compactness. In this study, we first examine some prominent compactness measures in the context of political districting and highlight some of their strengths and weaknesses. We next consider geometric regularity and some reasons why it may serve as a better metric than compactness for the purposes of political districting. Finally, we explore several methods which can be used to quantify regularity in arbitrary polygons.

Autoencoder-Based Anomaly Detection as a Tool for Initial ECG Screenings

Dr. Emily Hendryx & Thomas Dunn

Abstract

Electrocardiogram (ECG) data can provide a wealth of information about the health of a patient which a physician can use to develop a treatment. However, for the diagnosis to be correct the ECG must be read and interpreted accurately in real time. This presents a problem as even experienced clinicians struggle to distinguish normal from anomalous ECGs in cases when the differences are subtle or distributed over long periods of time. We present an autoencoder model to be used as an initial screening tool for ECG beats. An autoencoder (AE) is a machine learning model which learns to compress input data into a low dimensional vector representation and then reconstruct an approximation. The goal for such a model is to learn to reconstruct the input data as well as possible, which requires learning an effective representation for the data. An AE that is trained to reconstruct one class of data (normal ECG beats) will have a high error when trying to reconstruct data from another class (anomalous beats). Our model uses reconstruction error to discriminate between normal and anomalous beats which can then be assessed by a clinician or passed to another machine learning model for classification. We investigate whether AE-based anomaly detection methods are more effective than other methods for anomaly detection in ECG data. We compare the performance of our model on the MIT-BIH Arrhythmia Database against traditional classification methods.

Applications of Linear Algebra in Games of Strategy

Ethan Bruegel, Chase Minden, & Gabriella Oliver

Abstract

Linear Algebra is utilized in various disciplines, both theoretically and practically. However, Linear Algebra concepts can also be employed for recreational purposes. This poster will highlight the connections between Linear Algebra and Game Theory by examining specific everyday games, while providing appropriate background information.

Data Subset Identification Using CUR Index Selection Schemes

Dr. Emily Hendryx

Abstract

The DEIM-CUR matrix factorization has been demonstrated to be a viable subset selection tool in the electrocardiogram. The CUR factorization, however, can be formed in a variety of ways. We present a comparison of some of these CUR methods with some commonly used clustering algorithms, evaluating each method's performance on three different types of data. In doing so, we demonstrate the utility of CUR index selection schemes in data subset selection.

Determining the Probability of Losing after a Player's Turn in the board game "Forbidden Island"

Chase Compton & Ryan Webb

Abstract

In Forbidden Island, players need to work together to collect 4 treasures and escape the island before it sinks. The game consists of 24 tiles, 9 of which are needed to win the game. One tile, named Fool's landing, is required to escape the island while 8 treasure tiles are needed to collect the 4 treasures. As the game progress, tiles begin to flood or sink in response to cards drawn from the Flood Deck.

The research conducted looked at several factors in the game that increases the probability of losing at the end of any turn. The factors included the number of flooded tiles and losing cards in the Flood Deck. Mathematical modeling was used to understand how conditions worked together, and formulas were developed to determine the probability of losing at the end of the current turn. These formulas were adopted into a program which players can use to decide what actions must be taken to help minimize their chances of losing. Thorough testing in real-world conditions showed significant gains in win rates when using this guidance.

Class Research LegalShield Advertising Practices

Geneva Mendoza, Richard Hall, Sam Pratt, & Nichole Beyer

Abstract

Working with LegalShield in a class-based project, we will examine the bounce-back rate on their web advertisements to determine which ads lead to more engagement and further sales. To do this we will look at the correlation between spends and sales across different products LegalShield offers. We will look at how LegalShield advertises state by state. The hope of this project is to help the company specify where they should direct their advertisements more efficiently in order to maximize sales.

Designing Mountain Pine Beetle Intervention Using Mathematical Modeling

Sean Lavery & Devon Smith

Abstract

The purpose of this research is to build and analyze mathematical models that will track the spread of the Mountain Pine Beetle (*Dendroctonus ponderosae*) and create theoretical studies of control or intervention. *D. ponderosae* is a species of bark beetle commonly found in the western forests of North America and are one of the few types of bark beetle known to kill their host tree. *D. ponderosae*'s population has been on the rise, and if left unchecked, could bring about untold destruction of the forests in which these trees inhabit. Our model is a system of differential equations which we analyze numerically to determine conditions favorable or unfavorable to beetle outbreaks and to propose potentially effective control measures.

Examining Oil Field Contractor With Cantrell Jackson

Fernando Salazar-Salas

Abstract

Working alongside Cantrell Jackson, a software developer for oil field services, we show that profits can be linked to customer interactions, individual customer jobs and the efficiency of the customer via the use of trucks. The most profitable customer interactions can be correlated to the demand of said customer. The conditions can be evaluated by response and resolve time to each client by source and type of interaction initiated and can be affected by the difficulty level of the issue being resolved. Invoice totals are linked to job type and job type frequency. We can evaluate the use of trucks per customer, the type of truck most commonly used, and the efficiency or inactivity of trucks per customer to determine the most profitable customer.

The Development of an Algebra Inventory for Calculus Success

Liz Lane-Harvard, Ph.D.

Abstract

Calculus 1 DFW rates are notoriously high, deterring students from majoring in STEM. In a report orchestrated by the MAA, they concluded that there is either something wrong with Calculus 1 admittance requirements or with instruction. This project considers the former. The purpose of this multi-year project is to develop an open-source inventory, like the Force Concept Inventory, of concepts necessary for students to succeed in a university Calculus 1 course. This project utilizes an exploratory, mixed methods instrument design study approach incorporating both quantitative and qualitative data. This poster will explore the development of the current inventory.

MODULAR MAGIC SQUARES AND PENTAGONS

Effouehi Messou & Ronnie Williams

Abstract

Long before Sudoku people were interested in a different type of number puzzle called a “magic square” which is a square grid filled with distinct positive integers such that each cell contains a different integer and all of the rows, columns, and diagonals must add to the same value. As early as 190BC, mathematicians have been fascinated by these magic squares and have discovered some amazing results concerning them as well as generalizations and modifications of them. In this poster we will describe one such generalization known as the “modular magic square” in which the rows, columns and diagonals must no longer add to the same value, but rather the remainder we obtain when we divide those rows, columns and diagonals sums by some fixed values must be equal. In addition, we will share a few of the results we have proven concerning modular magic rectangles; namely, we will describe conditions for which a modular magic rectangle can have rows and columns which all sum to even, or all sum to odd, values. We will also describe “modular magic pentagons” in which the sum of each side of the pentagon is congruent modulo an integer, then show results concerning the sides of a pentagon being even or odd.

infinite square well

Jacob Mantooth

Abstract

In this paper, we will be trying to solve the problem of the dimension infinite square well in quantum mechanics with boundary condition to find a particle. We first have a particle that is free to travel wherever it wants and that can be anywhere at any time. We then limit this particle to still be able freely travel but is confined to be between the positions 0 and L . This particle is trapped inside the well by walls of infinite potential energy that repels it if the particle touches it. We will be showing at the end that there a particle in an infinite square well has a wave function that are the probability of finding the particle.

Investigating the Modular Pascal's Triangle

Ronnie Williams & Zachary King

Abstract

A peculiar property of Pascal's Triangle is that when the entries are reduced modulo a prime number, they exhibit fractal structure. Previous research sought to describe this fractal structure utilizing a variety of techniques including group theory, computational techniques with generator rules, and number theoretic techniques. Building off of this research, we hope to demonstrate, with this poster, new research being done to understand and describe the interesting and complex behavior of Pascal's Triangle under modular arithmetic.

Polynomial multiplication using Karatsuba and Toom-Cook algorithms and their applications

Goodness Agboola

Abstract

In this presentation, we will discuss multiplication algorithms that can be applied to solve problems in applied fields such as Cryptography. The Schoolbook method to multiply two n terms polynomials takes (n^2) steps, which is quadratic in terms of input size. We will talk about faster methods like Karatsuba's algorithm that takes about $n^{(1.585)}$ steps and Toom-3 algorithm with approximately $n^{(1.465)}$ steps and their applications.

Exploring modeling by programming: insights from numerical experimentation

Sean Lavery

Abstract

We present an overview of three undergraduate mathematics research projects and an approach that encourages computer programming and numerical experimentation as key elements of the research project. We give advice for students looking to begin a project in mathematical biology or for faculty looking to branch out to a new research area. This poster summarizes content of an invited chapter in an upcoming book on undergraduate mathematical biology research.

Mathematical modeling ATP activity

Benjamin Jones & Sean Lavery

Abstract

Adenosine triphosphate (ATP) is a crucial molecule in many cellular pathways and processes. The role of ATP as a source or as a carrier of phosphate involved in the phosphorylation of other molecules is well known. However, few studies discuss the pathway of hydrolysis from adenosine to ATP and the reverse pathway of dehydration from a dynamic perspective. In this project we develop and study a system of differential equations describing the kinetic interactions that drive changes in concentrations of ATP, ADP, AMP, and adenosine over time. In an attempt to gain knowledge about physiological drivers of the pathway, we use numerical experiments to study the production of ATP, ADP, AMP, and adenosine in response to changes in initial concentrations and in various binding and unbinding parameters. We believe that results of our numerical testing could yield biological insight when it comes to investigating these molecules and their physiological roles.

Self-reported Utilization of Medical Cannabis in Western Oklahoma

Lisa Appeddu, Brianna Pritchard, Makenna Rose, Stephen Drinnon, & Scott Graham Long

Abstract

Medical cannabis was approved in the state of Oklahoma on June 26, 2018, through State Question 788. The Oklahoma Medical Marijuana Authority (OMMA) was created to oversee the medical cannabis program in Oklahoma. However, the law outlines no qualifying conditions, and the OMMA physician recommendation form does not require physicians to record a patient's medical diagnosis. The primary purpose of this research was to define the self-reported conditions for medical cannabis administration in rural Western Oklahoma. Secondary measures included patient demographics, treatment regimen, side effects, and perceived benefits of therapy. A ten-question, paper survey was distributed by four participating dispensaries found in Weatherford, Arapaho, and Hydro, Oklahoma. Forty-eight patients voluntarily participated, and data was collected anonymously in Fall 2019. Descriptive statistics were used to summarize preliminary results. Anxiety (33.0%) and assorted pain conditions (34.0%) were the most common self-reported conditions for medical cannabis administration. Thirty-seven out of 47 subjects reported use of medical cannabis for the treatment of more than one medical condition. Future analysis will include correlation between secondary measures and medical cannabis administration, as well as comparison of results to other research findings. This initial study will contribute to the understanding of how and why patients are using medical cannabis in Oklahoma.

Topical Non-Steroidal Anti-Inflammatory Drug and Dimethyl Sulphoxide Combinations: Potential for Added Therapeutic Benefits

Barrett Powell & Scott Graham Long

Abstract

Non-steroidal anti-inflammatory drugs (NSAIDs) and dimethylsulphoxide (DMSO) are mainstays of therapy in treatment of joint injury/disease in veterinary medicine, reducing pain/swelling associated with inflammation. The current project is a review of the literature to a) ascertain which types of products have demonstrated effectiveness and b) the potential for a combination of an NSAID and DMSO as a potentially effective drug combination that could provide additive/synergistic anti-inflammatory effects. A review of the FDA “Green Book” for medications and formulations available for use in veterinary medicine indicates that NSAIDs may be administered orally, parenterally, or topically. Products approved by the FDA that contain DMSO are formulated for topical use. However, DMSO is recognised as an excellent solvent that may enhance the topical absorption of other drugs. A review of the scientific literature indicates that NSAIDs such as phenylbutazone and flunixin are soluble in DMSO in concentrations ranging from 25 mg/ml to 30 mg/ml. The literature also indicates that DMSO enhances the percutaneous absorption of a wide range of drugs. Additionally, a review of the pharmacology literature indicates that NSAIDs and DMSO exert their anti-inflammatory effect by differing mechanisms. Therefore, it appears that a topical combination of an NSAID and DMSO should provide a greater anti-inflammatory effect than either drug used alone.

Ground Verification of the NASA/JAXA Global Precipitation Measurement Project Using CoCoRaHS Precipitation Data

Karen Williams

Abstract

Precipitation data has been measured at my location and stored online by CoCoRaHS for over a decade. The Global Precipitation Measurement Project (GPM) precipitation predictions from multiple satellites for my coordinates during this interval was downloaded from NASA using Giovanni software. Ground verification from many entities are working on the accuracy of GPM data and members of CoCoRaHS were invited to participate. The GPM data was compared to the measured precipitation at my location to determine the accuracy of the GPM data. The precipitation for a month will be examined to determine if GPM is consistently predictions are too high or too low for a particular month or season. Preliminary comparisons from 2016 yielded a correlation of 0.8526 while the correlation was much smaller for 2018 at 0.7022. Total predictions of precipitation for these two years both showed only slightly over an 11% error. Additional data will be examined in this study.

Investigating the Relationship Between Attenuation Coefficients of Light and Sound in a Sunflower Oil Medium

Dylan Barber

Abstract

There exist similarities between the equations used to calculate the attenuation coefficients of electromagnetic and acoustic (or ultrasonic waves). Those similarities prompted our research question. We sought in our study to better understand the relationship between the attenuation coefficients of light and sound in an effort to build upon the tools used in diagnostic imaging and radiation therapy treatment planning. This research examined the ultrasound attenuation via the slope method utilizing Bouguer's Law. The optical attenuations were calculated using Beer's Law. Samples were tested at 3 different temperatures 15, 20, 25 degrees Celsius and sound frequencies 1, 2, 4 MHz. Future work would include further investigation of the attenuations and temperature or other complicating variables.

Variability Study of RR Lyrae Star TV Lyn

She'Kayla Love

Abstract

In this research, we are presenting the light curve of RR Lyrae type variable star. The name of our star is TV Lyn. This star is observed in the northern hemisphere and its coordinates are 113.38262, 47.80280. RR Lyrae type stars are the brightest representative of the variable stars. They are typically low mass and found within an instability strip with a temperature ranging from 6000 K to 7250 K. These stars are only located in solar systems that contain a stellar component older than 10 Giga-years. Therefore, study of these stars can provide us information on the distance and properties of a specific solar system. We

are using the data from Las Cumbres Observatory (LCO) which consists of a worldwide network of robotic telescopes. Photometric measurements were conducted using the 0.4 meter SBIG telescope. We have used advanced photometric techniques developed by Dr. Michael Fitzgerald & his team as a part of solar sibling project. Depending on the color of a star, luminosity changes in different color filters. Our data consists of four filters, B (Blue), V

(visual), I (Infrared), and Z (PAN-STARRS). Results show that this star has a variability period of 0.2409 ± 0.003 days. Further analysis of our data can provide us information on intrinsic and extrinsic variables of this star.

Photometric Analysis of RR Lyrae SS For

Jonathan Risner & Susmita Hazra

Abstract

In this paper, we are presenting photometric analysis of a RR Lyrae type of variable star. These stars have low metallicity with mass and size like the Sun. They have a relatively low period about 0.2-1 day, makes them one of the most useful stars for exploring groups of stars that are similar to each other in terms of age and chemical composition. We are studying the RR Lyrae star “SS For” located in the global cluster M3 in the southern hemisphere with coordinates (31.96664, -26.8661). We are using the data from Las Cumbres Observatory (LCO) which has network of robotic telescopes located across different parts of the world. The data we are using are from SBIG (0.4 m) telescopes which has four different filters, B (blue), V (visual), I (infrared), and Z (PAN-STARRS). We have used advanced photometric techniques developed by Dr. Michael Fitzgerald & his team as a part of solar sibling project to study the light curves of SS For star. Results shows that this star has a variability period of 0.98909 ± 0.00028 days using the standard deviation method. Further analysis of our data can provide us information on intrinsic and extrinsic variables of this star.

A Study of Reflectivity of Failed Optical Storage Media

Douglas Bryhan

Abstract

One of the most common optical storage media used today is the DVD. In this technology, a laser is reflected off a layer of a laminated disc and depending on the patterns of pressed “dots” on one layer of the disc the beam will either be reflected back or diffused. However, failure of the reflective layer can result in discs that “go bad” even if they are not otherwise abused (surface scratching, etc). Oxidation of the reflective layer due to a failure of the glue seal on the edges of the discs that holds the laminations together is commonly blamed.

This is an introductory look at the reflectivity changes in discs that have failed using an Ocean Optics Spectrograph with the goal to better understand the mode and rate of degradation as a function of time in prerecorded media. Other discs that go back to the early days of the media in the mid ‘90’s will be compared in an effort to establish longevity guidelines for optical media.

Boron Doped Carbon: A Tunable Morphology

Aaron Austin & David McIlroy

Abstract

Our group has successfully synthesized a new mesoscopic material via Chemical Vapor Deposition (CVD) technique in an attempt to dope boron on a form of Pseudo-Graphite known as GUITAR. By adding a boron precursor into the solution we discovered new mesoscopic structures that have formed with varying tubular morphologies. We call these novel structures BOD (Boron Orthocarborane Doped) Carbon and intend to explore their growth characteristics and possible applications. Some of these applications include hydrogen storage and improved battery technologies.

A CVD technique is used to grow this material. Through this method we flow nitrogen into a flask that is heated on a hotplate. The vapor is then carried through a tube furnace at 900 °C where the structures are then grown for various times. We have found that by manipulating time of the reaction and amount of boron in our mixture as well as cooling rate we can create different morphologies.

Due to the nature of the material growth we hypothesize that it is possible to tune the structures to vary in their application. For instance, an important aspect of improving Li-Ion batteries is surface area of the electrode material. Naturally, BOD Carbon has a high surface area due to the tubular structure increasing the storage capacity and performance of Li-Ion batteries.

The Dobsonian Telescope: An Outreach Exploration III

Cameron Cinnamon & Daniel Gassen

Abstract

We have reclaimed optical equipment from some of our older, unusable telescopes, which has been incorporated into new portable Dobsonian telescopes. These portable telescopes are ideal for use in viewing sessions in more distant communities, and on trips. We started by building a new Dobsonian base for a broken telescope. This took several attempts before we had a smoothly functioning piece of equipment, and we learned through trial and error how to be extremely precise with our measurements. Next, we built a telescope from scratch around a 6-inch diameter mirror. Considerable care was required to ensure the telescopes move extremely smoothly and can be pointed very precisely- this is the challenge in building a usable (great) Dobsonian telescope. We mastered this level of precision in our smaller telescope builds. Now we are in the process of building a telescope from scratch around a 16-inch diameter mirror which was donated to the SWOSU Physics Department many years ago. We are well underway with the design and construction process. Every aspect of the 16-telescope, affectionately named "tiny," is significantly more challenging and demanding than what we have experienced in the previous builds. The 16-inch telescope, when completed, will rival the automated telescope in the SWOSU observatory. In addition to using it for on-campus observing sessions, we hope to use this telescope as part of Physics Club community outreach by taking it to other towns.

Analysis of Algorithms for Analyzing Cochlear Mechanics

Petral Abong & Scott Mattison

Abstract

Optical coherence tomography (OCT) is a noninvasive diagnostic technique capable of providing structural information millimeters deep in tissue. The goal of this research project is to analyze various algorithms for utilizing Optical Coherence Tomography to quantify vibrational motions in layered tissue structures. Currently, a technique known as optical coherence vibrometry serves as a powerful tool for extracting vibrational motion parallel to the imaging axis. We hypothesize that we may develop an algorithm for extracting bulk vibrational motion of tissue structures by monitoring changes in signal speckle patterns over time. To test this hypothesis, we utilized a piezoelectric chip and quantified its vibrational motion at various angles relative to the imaging axis. We then compared the results of the measured vibration using both an existing optical coherence vibrometry technique and our new speckle algorithm.

Interactions among Graphene, Carbon Nanotubes, and Polymer: A Density Functional Theory Study

Sanjiv Jha

Abstract

Carbon nanomaterials, such as graphene and carbon nanotubes (CNTs) are used to enhance the mechanical properties of polymers. In this work, we performed a computational study based on density functional theory to investigate the interfacial interactions among graphene, CNTs, and Nylon 6. The role of Stone-Wales (SW) defects on the interaction energies were also examined. The results of our study show that CNTs and graphene form stable complexes, and the presence of SW-defects on CNTs weakens the CNT-graphene interactions. Our result that the CNT-graphene interaction is much stronger than CNT-CNT interaction suggests that graphene could be able to promote the dispersion of CNTs in the polymer matrix, resulting in an enhancement in mechanical properties of nanocomposites containing CNT-graphene nanocarbons.

Analyzing SN 2012fr Spectra through SYNOW

London Willson

Abstract

Type 1a supernovae (SNe 1a) are exciting and important to study because they are probes for dark energy and were the main component in the research that led to the discovery of dark energy and the 2011 Nobel Prize. Their explosions are some of the brightest in the universe and by using spectral synthesis we gain clues that bring us closer to understanding the details of the explosion. Supernova 2012fr (SN2012fr) is of particular interest due to its slight irregularity from a standard type 1a.

The Development of Maladaptive Perfectionism: The Role of Parenting, Depression, and Emotion Regulation

Leslie Moore

Abstract

Maladaptive perfectionism (MP), is related to depression (D) and suicide ideation (SI). Poor emotion regulation (PER) is also related to (D) and (SI). As the second leading cause of death for those between the ages of 15 to 24, understanding the affects of MP and PER as possible determinates of SI is important in efforts to prevent suicide attempt and success. However, no research has worked to construct a theoretical model to form a basis from which to test these possible determinates. The purpose of the present study was to replicate past research findings to establish a basic model showing the relation between MP, PER, and D. The present study is part one of three studies that aims to incorporate factors of parenting, MP, PER, and D in determining SI. The sample consisted of 151 students taking general education courses at a regional university in the Southwest region of the United States. A regression analysis revealed that MP and PER accounted for 49.1% of the variance in D ($R^2=.491$, $F(2,149)=71.797$, $p<.000$). Specifically, PER significantly predicted D ($\beta; = .606$, $p<.001$), as did MP ($\beta; = .161$, $p<.05$). The results will be used to inform study two. Study two aims to investigate factors of parenting in the development of PER and MP which then contribute to D. A study three will investigate the full model in predicting SI.

Honey Bee Expectancy Learning

KiriLi Stauch

Abstract

Traditionally, animal expectancy research has focused on appetitive and avoidance behavior studies. In this study, honey bees (*Apis mellifera*) were tested in a series of three proboscis extension response (PER) experiments to determine to what degree bees form a cognitive-representation of an unconditioned stimulus (US). In experiment one, bees were presented with a stimulus (i.e. sucrose or honey). In experiment two, bees were tested on a conditioned stimulus (CS) (i.e. cinnamon or lavender) paired with the US (i.e. sucrose or honey). In experiment three, bees were presented with a CS (i.e. cinnamon or lavender) paired with a US (i.e. honey or sucrose). The US was not given until after the proboscis was retracted. Bees exhibited significantly longer PERs to the honey compared to the sucrose. They did not exhibit significantly different CS responses with regards to proboscis retraction times, suggesting that the bees did not associate a specific unconditioned stimulus with the conditioned response.

Analysing the Relationship Between Attitudes and Performance in Statistics Classes

Abigail Wingard & Melinda Burgess

Abstract

Students are often afraid of statistics or report seeing no practical usage for them (Garfield, Hogg, Schau, & Whittinghill, 2002). Unwillingness to work with difficult material or being too fearful to try relates to lower grades, poor understanding, and little future interest in statistics. Statistics and their correct usage and interpretation are useful, if not essential, in many careers students choose. These careers include nursing and psychology, the field many students in a psychology statistics class are pursuing. Our question is what predicts success or failure in a statistics courses.

A pool of students was taken from psychological statistics classes at a medium-sized Midwest university. Students completed pre and post surveys of attitudes towards statistics which assessed statistics self-efficacy (SATS) as well as measures of various personality characteristics (Need for Cognition (NFC), (Caccioppo & Petty, 1980) and Openness from the Big Five (the mini IPIP)) characteristics. We also measured basic demographics including their GPA and previous math and statistics class experience.

End-of-semester analyses allowed us to compare pre and post surveys and grades to better understand what factors predicted student success in this course. By understanding what role self-efficacy, need for cognition and openness play we can better structure assignments to maximize student performance.

Gender Differences in Serial Homicide

Nikki Igo

Abstract

Background: There has been an abundance of research conducted on serial homicide. However, there has been limited study on the differences between male and female serial killers. The purpose of this study is to identify variable trends between male and female serial homicide offenders. Data used for this study was extracted from the Radford/Florida Gulf Coast University Serial Killer Database.

Methods: Data extraction was conducted using Microsoft Excel and included information related to serial killer individuals and teams, name, date of birth, sex, sexual preference, number of victims, and race. For every serial killer, the corresponding victim profiles were entered, in chronological order, by date of attack. The following information was extracted from victim profiles: Name, Date of Attack, Age, Sex, Race, Target, Weapon, Method of Kill, and Treatment.

Results: Both male and female serial killers show steady escalation with victims 1-4 and then de-escalate between 4 and 5 with escalation returning between victims 5-7 and de-escalating again between 7 and 8. Differences were identified in male and female serial killers in victim selection, weapon of choice, method of kill and treatment of victims.

Effect of Sexualization and Gender of Video Game Protagonists on Purchasing Behavior

Miranda Woodard, Alex Cassidy, Kamron Fakhreshafaei,
Aaron Cornell, Samantha Cowan, & Jackson England

Abstract

Forty-six percent of females and fifty-four percent of males play or have played video games (Statista, 2019). Many video game covers present females in a sexualized and secondary manner (Glaubke et. al, 2009). However, many females prefer to play as a non-sexualized female protagonist (Hartmann & Klimt, 2006). Little research has directly examined the effect of gender and sexualization of protagonists on the video game cover on purchasing behavior. Covers are often used as they are typically the first exposure to the game. We examined the sequence of examination of video game covers when considering them for purchase. Video game covers were created varying by gender and the extent of sexualization (non-sexualized, sexualized) of a primary character. The covers represented a variety of different genres. 50 participants (mean age 20.5 years, college students) were shown 16 covers in a 4X4 array and asked to decide which they would be most likely to purchase. They were instructed to indicate which cover they would first select to learn more about. Then to indicate the order they would examine any others they would like to learn more about. We recorded the order of examination as well as the game most likely to be purchased. Participants then completed a survey that included demographics and video game interests and history of play.

THE RELATIONSHIP BETWEEN MOTIVATIONAL ORIENTATION, MINDSETS AND CRITICAL THINKING IN COLLEGE STUDENTS

Christopher Garland

Abstract

Scope and Method of Study: The purpose of this study was to explore the relationships between the expression of critical thinking and motivational orientation (i.e. autonomy, controlled and impersonal) and the relationship between expressed critical thinking and self-theories of intelligence mindsets (i.e. entity vs. incremental). Correlation and multiple regression analyses were performed to examine the relationship between motivation orientations and mindsets on critical thinking. The sample for this study consisted of 106 college students recruited from three Midwestern universities with ages from 18 to 25. Findings and Conclusions: Regression analysis revealed a significant relationship between autonomy and controlled motivation orientations and critical thinking. Autonomy orientations had a positive predictive relationship with critical thinking while controlled orientation had a negative predictive relationship with critical thinking. Neither the impersonal orientation nor mindsets indicated a significant relationship with the expression of critical thinking. This finding is consistent with the interpretation that the autonomy orientation may function similarly to the proposed ‘critical thinking disposition’ so prevalent in the critical thinking literature. Rather than an inherent psychological trait being responsible for the exhibition of critical thinking (i.e. disposition), the expression of critical thinking may rely rather heavily on motivational factor

Rating of Memes by College Students

Samantha Cowan

Abstract

In 2017, 2.48 billion people used social media (Statista, 2019). With numbers such as this, the influence of viewing memes on social media platforms should be examined. Specifically, the question of the influence of viewing "offensive" or stereotype presenting memes on an individual's perceptions of news media can be examined. Exposure to oral and visual presentations of stereotypes, including in memes, can change attitudes (Duchscherer & Dovidio, 2016). Memes are often viewed as a type of humor and may not be considered offensive. In a planned study we will test whether viewing memes (offensive or neutral) affected perception of news stories. The goal of this study was to develop stimuli for an experiment addressing the effect of exposure to memes on perception of information.

Method: Approximately 30 college-aged participants rated a total of 90 memes. Each individual participant rated 30 memes. The memes were presented via PowerPoint and were rated on several factors including, level of humor, shareability, and offensiveness.

Results and Conclusions: Based on the ratings given to each meme, each meme was sorted into a category (i.e., offensive, neutral). For example, memes rated high on offensiveness were sorted into the offensive category. This ratings will be used to determine presentation of stimuli within the related study.

Who Will I Be?: Character Creation Preferences for Video Game Characters

Miranda Woodard, Kamron Fakhrrshafaei, & Samantha Cowan

Abstract

Problem

Video games have become increasingly popular over the last decade. In 2017, according to Newzoo, 46% of gamers were female, 66% of those women being in the United States. However, 74% of video game developers were male (Statista, 2017). There is a difference in the preferred games of males and females (Statista, 2017). Our question is: Do video game developers provide consumers with the amount and type of character customization/creation options that they desire? We examined player ratings of importance for a variety of modifiable playable character elements.

Method and Results

50 participants rated a variety of different elements of video game characters that can be modified/customized (e.g., race, sex, and skin color). Weapons and dress preferences were examined. Participants rated how important it is for them to be able to modify/customize each element. Preliminary analyses indicate that the most important customization option for players is sex, with 50% of the participants saying that it is very important.

Conclusions

Preliminary results suggest that video game players will create characters similar to themselves when provided this option. The implications for video game development and preferences of video game genres across genders will be discussed.

Cash or Card and How It Effects Spending Habits: A Case Study

Celeste Singleton & Vickie Jean

Abstract

The way we manage money has been shown to be directly correlated with overall levels of happiness, quality of life, and well being in individuals. Research has shown that the immediate presence of money and as lack of debt actually have more of an effect on happiness than wages earned. The objective of this study is to see whether payment form, specifically cash versus card, has an effect on overall amount of money spent, as well as what emotions drive these behaviors. The current study asks whether using cash instead of a card will lead to overall lower levels of spending as well as if there is a direct relationship between experiencing negative emotions and higher levels of spending. The participant was a 25-year old female college student. The participant was asked to daily record her spending, whether she used cash or card, as well as her primary emotion felt immediately before making the purchase. Analysis of the findings showed that there was a strong correlation between payment form and amount of money spent. Specifically, the participant spent more on a daily basis when using a credit or debit card than when using cash. Analysis also showed that there was actually a negative correlation between negative emotions and money spent. Based on these findings, it was concluded that paying with cash does result in lower spending. It was also determined that negative emotions did not lead to higher amounts of spending in this specific individual, but positive emotions did.

Familiarity of situation that makes us smart: Situated Cognition over Numeracy

Taro Iwase

Abstract

Numeracy is one of the essential life skills adults need to function within society, however many adults struggle with basic arithmetic operations necessary to daily lives. Most often, poor numeracy is attributed to an individuals' low intelligence or illogical personality. Yet, researchers have uncovered correlations between math test scores and IQ. Theories, such as, Situated Cognition, Naturalistic Decision Making, and Ecological Rationality suggest environmental factors may affect the ways individuals interpret and manipulate numbers. There is little research which addresses the issue of familiarity in these situations. It is not clear if any specific situational cue may promote numeracy. So, the question remains whether the level of familiarity affects the extent to which individuals can perform mathematical tasks. The purpose of this study is to examine the mediational effect of the familiarity of situations and the link between Situated Cognition, and objective and subjective math scores among adult learners. The experiment is currently underway and preliminary results to be explored. The results may reveal familiarity of situations assist people with numeracy, in which teaching aids can be improved accordingly. Theoretically, the results may also disclose the accurate view of human rationality, where high-level cognitive functions are not similar to IQ, but rather an adaptation to environmental cues and exploitation of personal experiences.

Female Representation on Video Game Covers over the Last Two Decades

Alex Cassidy, Aaron Cornell, Kamron Fakhreshafaei, Miranda Woodard, & Samantha Cowan

Abstract

Problem

Approximately half of all video game players are female (Gough, 2019). Females and males consistently play different types of games and prefer different features of video games (Pew Research, 2017). For example, females may choose to play video games with greater representation of females on video game covers. The purpose of this study is to explore the representation of females on video game covers across years from 2000 to 2019.

Method

This study examined video game covers from the years 2000 to 2019. The top 50 rated games from each year were coded. Ratings were obtained from Metacritic. Each character that appeared on the cover was coded by their gender, their positioning on the video game cover, and if the character was sexualized. Each cover was coded with interrater reliability.

Results

Preliminary analyses indicate that 40% of games from the early 2000's and late 2000's contained a female on the cover. The total number of females represented on the covers was not significantly different. Although more recent games often had more total characters, females represented 24% of overall characters in the early 2000's compared to 14% from more recent games. The percentage of games with a sexualized female was not significantly different across the time periods.

Conclusions

Preliminary analyses suggest the representation of females in top rated video games stayed the same for video games in the early 2000's and late 2000's.

A Street Car Named Envy and Aggression

Leila Murphy

Abstract

Envy is a well-known unpleasant emotion that is often characterized by inferiority and resentment and appears when we compare ourselves to others (Parrot, 1991). Understanding the nature of envy, and its purposes are important to understanding and explaining behaviors, such as aggression. The two components created by Cohen-Charash (2009) help define envy, and when it occurs. The cognitive appraisal component and the feeling component help distinguish envy from other emotions (Cohen-Charash, 2009). For example, there are many people who mistake envy and jealousy as being the same emotion. However, jealousy happens when a person fears losing an important relationship with a rival, and envy occurs when a materialistic item is desired (Parrot, 1991/1993). Envy's operational definition in science has been linked to aggression but has provided little to no empirical evidence that envy and aggression are linked. To help better understand the nature of envy, the proposed study aims to examine the relationship and link between envy and aggression.

Jealousy and Compersion in Polyamorous and Monogamous Relationships

April Phillips & Laura Hix

Abstract

The current study compares polyamorous and monogamous relationships. By definition polyamorous relationships include multiple sexual partners; thus jealousy is a common concern. However, jealousy may operate differently in these relationships. For example, the negative effects of jealousy might be offset by feelings of compersion. Compersion, defined as taking pleasure in a partner's happiness with his/her other relationships, is generally perceived as a positive benefit of polyamory. This study examines the relationship between compersion and jealousy in both types of relationships. As part of a larger study of their relationships, participants were asked to imagine that their partner disclosed a romantic interest in another person and report their feelings of both jealousy and compersion. Not surprisingly, those in polyamorous relationships reported lower levels of jealousy compared to those in monogamous relationships. However, this relationship between relationship type and jealousy was mediated by feelings of compersion. Thus, it appears from these results that compersion may serve to protect those in polyamorous relationships from the negative effects of jealousy.

Are the frequency and lengths of daily calls impacting the tone and patience while communicating with an adult child with Borderline Personality Disorder?

Nathalie Tahmassebi

Abstract

Hypothesis: There is a direct relationship between the frequency and length of telephone calls between an adult child living with Borderline Personality Disorder and my tone and patience during the call.

Abstract: If a member of a family lives with Borderline Personality Disorder, communication can be challenging. While symptoms might include (1) efforts to avoid real or imagined abandonment, (2) chronic feelings of emptiness, and (3) temporary, stress-related paranoid ideation or dissociative symptoms (DSM-5), they lead to reaching out. The methodology consists of a treatment of 6 weeks. While the study is still in progress, the anticipated results should show that the more frequent the numbers of calls and the longer the time spent on the phone during the day, the harshest the tone and the shorter my patience by the end of the day.

A Soundboard for Discrimination Learning in a Captive American Crow: Methodology and Apparatus Design

Amanda Somers

Abstract

A soundboard was developed to assess a captive American crow in discrimination tasks. The soundboard consists of six “talking tiles” with unique colors, audio recordings, and visual stimuli of tangible objects. The flexibility of the apparatus design mitigates the effects of learned proximity, color, and placement. Further, the soundboard is suitable for a wide range of discrimination and other learning tasks at varying levels of complexity. The aim of the pilot study is to assess sound and visual stimulus association as a means of discrimination learning in a single subject. The pilot study also tests the possibility of human-bird communication using such technology and has the potential to evolve into a means to communicate intangible concepts.

The Relationship Between Indecisive Behavior and a Need to Control

Cassie Ann Ridley

Abstract

The purpose of this case study is to examine the relationship between indecisive behavior and the amount of control an individual seeks when making decisions. Regret Theory and Perceptual Contrast Effect describe that decision making can lead to comparing choices for long periods of time and then feelings of regret if the wrong decision was made. I am hoping to reveal a better understanding of indecisive behavior and how it leads to different behavior in everyday life.

Does Crying Predict Stress Responsivity and Resilience?

Nathaniel Stafford, Hellen Yosef, & Ada Carnero

Abstract

Experiencing stress is a significant component of life, and individuals must develop coping strategies in order to manage such exposure. One coping behavior that has positive benefits on prior stress exposure is crying, however, the effects of crying on future stress and the underlying physiology is not well understood. To test the hypothesis that crying will predict future stress resilience, this study will establish an association between frequency of crying and qualities of perceived stress and resilience in undergraduate students. Participants will complete a multitasking procedure that increases in intensity and complexity and requires participants to simultaneously monitor for visual and auditory stimuli while completing arithmetic calculations. Participants are monitored for skin conductance and pulse and provide saliva samples for salivary cortisol analysis. Support for the hypothesis that crying predicts the physiological and psychological response to stress will extend our understanding of the implications of crying. Demonstration of crying as a predictor of reduced stress responsivity extends the behavior from self-soothing to an adaptive emotion-focused strategy that may afford subsequent stress resilience.

A Holistic Approach to Anxiety Reduction: Combining Yoga with Psychotherapy

Lauren Keller

Abstract

The issue of interest for the current project is integrating focuses of mind and body to increase the effectiveness of anxiety therapies and outcomes. The literature surrounding the effects of yoga practices contain mixed findings, and therefore more rigorous research is needed to help determine the effectiveness of yoga. The purpose of the current project is to fill a gap in the literature about how combining yoga with psychotherapy can together help reduce anxiety. In Study 1, participants (N = 37) completed the Hamilton Anxiety Scale (Hamilton, 1959) before and after a yoga session. Analyses from Study 1 demonstrated that (a) anxiety was significantly lower after yoga, and (b) 86% of participants reported that they would be comfortable seeing a yoga instructor for counseling if the instructor was also a licensed counselor. Study 2 is a in-progress study in which participants will be randomly assigned to one of three conditions (yoga, psychotherapy, or yoga and psychotherapy). The aim of Study 2 will be to analyze the relative anxiety reducing effectiveness of combining yoga with psychotherapy.

Career Decision Self-Efficacy: CDSE & the O*NET

Victoria Kinsman

Abstract

Introduction: Retention is a major focus in higher education. Several authors (e.g.: Kirk, 2018; Vespia, Fries, & Arrowood, 2018) suggest an increased focus on career development to increase retention. Building on Merrell, et al., (2018), we examined Occupational Information Network (O*NET) exposure for effects on Career Decision Self-Efficacy (CDSE; Betz et al., 2005). The CDSE scales (Self-Appraisal, Occupational Information, Goal Selection, Planning, & Problem Solving) use a 5 point Likert scale. We predicted that unguided O*NET exploration would lead to CDSE changes.

Methods: Participants completed a demographic questionnaire and the CDSE, explored the O*NET for 20 minutes, and then completed the CDSE again. Our sample consisted of 58 general psychology students (62.07% female; 67.24% White, 13.793% multiracial, no other races above 7%; 67.24% freshmen; 25.86% first-generation college students; 62.07% from a rural area). We conducted paired samples t-tests for each set of pre and post-test scores on each of the 5 scales and the total score. Cohen's d was used as a measure of effect size.

Results: All t-tests were significant at the .001 level. T-values ranged from -4.540 to -8.381. Cohen's d values ranged from -.596 to -1.1, representing medium to large effect sizes.

Conclusions: Our study suggests that exposure to the O*NET can lead to an increase in career decision self-efficacy. Based on our results, unguided exploration of the O*NET is a valuable interventi

An Increase in Mental and Physical Wellness by the Introduction of a Daily Walking Regimen

Vickie Jean & Samuel Bayless

Abstract

How much does a sedentary lifestyle affect your well-being? There is an entire field of science dedicated to determining the benefits of an active lifestyle, and the negative effects of a sedentary one. Would simply walking more lead to a better life? A case study will be completed to determine the extent to which introducing a daily walking regimen will affect a person's mental and physical wellness. For this study, mental wellness will be determined through measures of anxiety, stress, depression, and general positivity. Physical wellness will be self-reported on a daily basis. After a 3-week baseline period, a 15-minute walk will be taken within 1 hour of waking-up every morning for 2 months. Measurements of mental wellness will be taken at the end of every week. Based on past research, it is anticipated that the introduction of a daily walking regimen will result in a significant increase in both mental and physical wellness.

Validation of a Social Self-Efficacy Scale

Vincent Pinion

Abstract

Self-efficacy is one's sense of personal mastery or ability to perform a task. For this project, the Social Self-Efficacy scale (SSE-1), which predicts social skills and ability, will be analyzed and validated. Sherer et al. (1982) created a General Self-Efficacy scale with the intention as serving as a foundation for more specified areas of efficacy. The SSE-1 will be based off the General Self-Efficacy scale, with items adjusted to apply specifically to social self-efficacy. These findings may be connected with Reinforcement Sensitivity Theory (Pickering, Corr, & Gray, 1999). Self-efficacy improvement should foremost affect the Behavior Activation System, BAS (motivation to receive reward, extroversion), whereas good coping mechanisms which affect efficacy would lower the Behavioral Inhibition System, BIS (sensitivity to punishment, introversion) because social punishers would be better dealt with by the subject. Behavioral activation and inhibition describe appetitive and aversive reactions to outcomes, most readily applied to extraversion in social contexts; higher social self-efficacy should positively predict BAS scales and negatively predict BIS scales (Carver & White, 2013).

The proposed scale uses principal component statistical analysis, and cronbach's alpha reliability coefficient to mathematically deem the scale valid and reliable. Correlation strategies with other scales (e.g. social anxiety, BAS, BIS, self-efficacy) appeal to construct validity.

“Slow: Children at Play” Traffic Signs & Effects on Driver’s Speed

Jerod Clark

Abstract

Scientific research appears to be vague or nonexistent as to whether or not “Children at Play” traffic signs affect traffic speeds. This research reviews the statistics of child pedestrian accidents and the various occasional hazard warning signs used. This researcher explores vehicle speeds with signs present versus vehicle speeds without signs present on a high-traffic, neighborhood street in the southern United States. In this study, vehicle speeds were monitored for a set amount of time during a specific time of day without caution signs present. Vehicle speeds were then monitored for the same amount of time and day with caution signs present. Speed data was compared between signs vs. no signs. The researcher also measured the type of vehicle (i.e., car, truck, S.U.V., etc.), and perceived gender of the driver to determine if they were a factor in speed. The independent variable in this study is the caution signs (sign vs. no sign). The dependent variable this researcher used in the study consists of vehicle speed, recorded vehicle type, and the perceived sex of driver (male or female). This study found evidence that temporary "Children at Play" traffic signs significantly reduce driver's speed. However, according to research data in this study, neither the driver's perceived gender or the type of vehicle plays a role in determining driver speeds.

Healthy Eating and Exercise and the Effects on the Body

Amanda Schmidt

Abstract

This is an ongoing case study looking at an individual who has difficulty keeping a healthy weight, resulting in continuous sickly and weak feelings. The goals of the study are to determine if a healthier diet and an increase in daily exercise will allow the individual to maintain a steady weight and feel stronger.

Healthy ways to cope with stress for someone with anxiety.

Brooke Holland & Vickie Jean

Abstract

Millions of people experience stress and anxiety every single day. Previous research shows that among college students, these feelings of stress and anxiety stem from multiple triggers such as academic performance and pressure to succeed (Beiter, Nash, McCrady, Rhoades, Linscomb, Clarahan, Sammut, 2014). There are many ways in which those who experience stress and anxiety can cope but in many cases these coping mechanisms can be unhealthy and tend to cause more stress. In a one-subject case study, the participants stress level is measured on a scale of one to ten. One being very stressed and ten being not being stressed at all. The participant then identified specific reasons to why they feel stressed (i.e. Procrastinated schoolwork) or do not feel stressed (i.e. exercised, organized responsibilities) as well as if they also feel anxious or sick.

Effect of Status and Sexualization of Cover Character on Video Game Purchasing Behavior

Miranda Woodard, Kamron Fakhrrshafaei, Aaron Cornell, Alex Cassidy, Jackson England, & Samantha Cowan

Abstract

Due to an under representation of females in video games (Burgess et al, 2018), and the positive relationship between secondary sexualized females and video game sales (Near, 2012), we examined the effect of status of character on cover and gender of character on predicted buying behavior of participants.

We manipulated the presence of a character of different sexes on the foreground and background of video game covers. The character presence and sexualization ratings were used to determine their relationship on purchasing behavior. Participant viewed an array of covers and indicated which game they would select first to learn more about. Participants also indicated the order they would examine any other games of interest. The order and number of games examined were coded along with likeliness to purchase.

Approximately half of the males selected games with a male primary character. Females were more likely to pick a game with a primary female non-sexualized character. There was no significant effect of secondary character for females. Additional analyses will include more covers and participants. Preliminary analyses suggest that male and female video game players prefer different representations of males and females on covers. They reported being more likely to buy games that differed in the status of females represented and the sexualization of females represented on the covers. Implications for video game developers and the marketing for video games will be discussed.

Publication and Research Trends Among Neurological Residents

Analise Claassen, Jantzen Faulkner, Ian Fladie, & Matt Vassar

Abstract

In this study, we evaluate the relationship between publications during and after residency in the field of neurology as well as analyze the relationship between number of publications and characteristics such as gender and career path. We randomly selected 50 ACGME Neurology residency programs and recorded the number of publications, h-index, gender, fellowship choice, and career path for each graduate between 2013-2015. Each publication was sorted into time frames before residency, during residency, and after residency. The study included a total of 379 neurology residents from 25 different residency programs. Residents who pursued academic medicine had a significantly higher mean total publications ($M = 10.1$, $SD = 16.4$) than those who pursued private practice ($M = 4.2$, $SD = 9.0$) ($t_{377} = -4.5$, $p < 0.000$). The mean total publications for male residents ($M = 8.6$, $SD = 16.5$) was significantly higher than female residents ($M = 4.1$, $SD = 5.6$) ($t_{377} = -3.6$, $p < 0.0002$). A Pearson correlation revealed a relationship between publications during residency and publications after residency, with a Pearson product moment correlation of 0.61. This positive correlation demonstrates the importance of implementing strong research principles in a residency's curriculum. We also report a higher number of mean total publications by those who pursued academic medicine over private practice. In addition, the results showed an underrepresentation of female residents in neurology research.

Analyzing the Influence of Evening Exams on Success in General Chemistry

Ethan Bruegel, Emily Cowen, Ren Jian Lee, & Gabriella Oliver

Abstract

Historically, sections of General Chemistry at the University of Central Oklahoma have had high DFW rates. In order to combat this, an experiment was conducted during the 2018-2019 academic year where students in certain sections of General Chemistry took exams at two different times. Two professors were involved in the experiment and each had sections in both the Fall and Spring semesters. In the Fall semester, students in these sections took their exams in the evening outside of normal class time. The time typically spent in class to take the exams was instead used for review. In the Spring semester, students in these sections took their exams during regularly scheduled class periods. It was hypothesized that having more in-class review sessions would improve student success on exams and decrease DFW rates. The scores of all four midterm exams as well as the standardized American Chemical Society (ACS) final exam were collected. In addition to the exam results, other relevant demographic and academic information such as ACT math composite scores, gender, and high school GPA were used to create the dataset because it is known that a variety of factors impact academic performance. In order to determine if the extra class time allocated for lecture due to evening exam times was impactful, we utilized multivariate statistical techniques to compare student success between semesters. Our statistical models and results could assist faculty in improving students' performance

Publication Trends Among Ophthalmology Residency Graduates

Connor Polson, Samuel Shepard, & Matt Vassar

Abstract

ABSTRACT

Purpose: The aim of this study was to measure scholarly research productivity (as measured by the h-index) among ophthalmology residency graduates, as measured by peer-reviewed publication output, and its relation to future publication output.

Methods: This study is cross-sectional in nature and included a random sample of 50 ophthalmology residency programs. From each program, a list of graduating residents from years 2013, 2014, and 2015 was compiled and each graduate was search on Scopus, PubMed, and Google Scholar. The publications of each graduate were then identified and data was extracted and collected in a double blind, duplicate fashion by 2 investigators.

Results: Of the 50 randomly selected ophthalmology residency programs included in this analysis, 21 were included in our analysis and 236 names of recent ophthalmology graduates were found. Graduates that pursued a fellowships had a significantly higher mean total publication ($M=9.11$, $SD=12.91$) than those that did not ($M=2.68$, $SD=3.16$) ($t_{234}=-3.9$, $p=.0001$). Graduates that pursued fellowships also had significantly more first person publications and higher H-index values compared to those that did not ($t_{234}=-3.78$, $p=0.0002$) ($t_{234}=-3.93$, $p=0.0001$).

Conclusion: The positive correlations between graduates' research productivity, career and future research outcomes could present an interesting aspect for residency program directors or education policy makers.

Publication Trends Among Internal Medicine Residents, Fellows, and Graduates and Its Relationship to Future Academic Achievement

Ian Fladie, Cody Hillman, Ross Nowlin, & Matt Vassar

Abstract

Medical research is essential for establishing evidence-based care and furthering clinical practice knowledge for the success of physicians. Publication trends among internal medicine have previously been studied(2,3); however, our follow-up study also adjusts for gender when comparing research success. Our primary objective is to assess the influence that research in medical school has on residency success by analyzing fellowship placement, h-index scores, and continued research success measured by publications. We reviewed internal medicine graduates from 50 randomly sampled residency programs. After extracting our list of graduates, each graduate was searched on SCOPUS for degree, gender, fellowship pursued, h-index, academics pursued, and publications. Among the 50 randomly sampled programs, 328 graduates were identified and included in our analysis. Our study found that graduates with primary author publication before residency were more likely to go into academic medicine or pursue a fellowship after internal medicine residency. Given that Internal medicine provides several options following residency, research provides a qualitative measure of academic performance and future success. Our study highlighted no difference among gender and future career success. In conclusion, total publications, first author publication, and h-index scores independently indicate a significant positive correlation in pursuing a fellowship or academic medicine after residency.

Kidney Cancer Incidence and Mortality

Brooklyn Greene

Abstract

Our research examined the relationship between kidney cancer and both predisposed risk factors (male vs. female) as well as preventable risk factors (smokers vs. nonsmokers). We compared data from the WONDER Online Database, United States Department of Health and Human Services, The Center for Disease Control and Prevention, and the National Cancer Institute and were able to hypothesize that the most influential factors for developing renal cancer were gender and smoking tobacco. Our hypotheses were investigated using a correlation coefficient and a two-sample t-test by comparing Male vs. Female U.S. AAMR and Male vs. Female U.S. AAIR. Our two-sample t-test revealed a statistically significant difference in both the incidence and mortality rates. Male rates were higher than females in incidence and mortality. The percent of the population who smokes when correlated with the incidences rate of renal cancer resulted in a strong positive relationship. With these findings, we were able to conclude that U.S. as well as Oklahoma males are more susceptible to diagnosis and death due to complications caused by renal cancer than females and that those who smoke are also more susceptible to diagnosis and death due to complications caused by renal cancer than those who do not smoke.

How Child Mortality Impact Babies per Women

Angel Carlson

Abstract

Data was collected to investigate a possible link between babies per woman and child mortality. The dependent variable in this project was babies per woman. The independent variable was child mortality. A simple random sample of 35 different countries was taken from all countries. The relationship of the data was found to be almost linear, positive and moderate in strength with one possible outlier. The correlation R was 0.895. There is sufficient evidence to support the claim that there was a correlation between the number of live births per woman and the child mortality rate. The P -value for this study was 0. There was some confounding happening in this study. While child mortality rates are associated with the number of live births per woman, outside factors or variables could also be affecting the number of live births per woman for countries.

How Rarity and Condition Influence the Value of Collectible Coins.

Ezoua Bekro

Abstract

There are a variety of factors that influence the value of a collectible coin. The goal of this project is to predict the value of coins based on their rarity and condition. In order to determine how rarity and condition influence the worth of the coins, we will perform a multiple regression analysis to model the linear relationship between the explanatory variables (rarity and condition) and the response variable (value). The dataset we examine consists of estimated prices for Morgan silver dollars minted in the United States between 1878 and 1921. First, we will analyze the correlation and directionality of the data. Next, we will estimate the regression model. Finally, we will evaluate the validity and usefulness of the model. Results of this project could potentially help collectors and coin dealers better understand the variables that determine the price of a coin.

University Perceptions on Prioritizing Issues Related to Districting

Lawrence Dongilli IV, Cynthia Murray, Thomas Milligan,
Ph.D., & Liz Lane-Harvard, Ph.D.

Abstract

With the upcoming decennial census, political districting in Oklahoma and across the country is undergoing increased scrutiny. We investigate which issues people prioritize when determining whether a map is “good”. We present survey results from faculty, staff and students at the University of Central Oklahoma.

A Spatial and Longitudinal Analysis of Firearms Casework in Texas

Tracy Morris & Shannon Yeakley

Abstract

In Texas, more than 1.3 million people have a state license to carry a firearm, resulting in millions of guns in the system (<https://www.dps.texas.gov/rsd/LTC/reports/demographics.htm>). According to the Bureau of Alcohol Tobacco and Firearms, in 2018, 29,834 of these firearms were recovered and traced by law enforcement, and more than 10% of these were recovered in the Dallas area alone (<https://www.atf.gov/file/137261/download>). Plano is a city in the Dallas-Fort Worth metropolitan area. A group of students from the University of Central Oklahoma (SCHOLAR) was asked to assist a Firearm and Tool Mark Examiner from the Plano Police Department (PD) in Texas. The examiner provided data from a three-year period during which the Plano PD was contracted by other PDs and some Federal agencies in the surrounding counties to assist with analyzing recovered firearms. The data set consists of 1,608 completed cases, including variables for agency, type of case, incident date, received date, and completed date. The SCHOLAR group has been asked to clean these data and calculate percentages of cases by agency and case type. They have also been asked to analyze changes in case completion times over time and identify significant differences in case completion times (if they exist) by agency and case type. This presentation will detail the results of this analysis.

Stroke Mortality Among Race and Gender

Anne Pate & Richard Seeberger

Abstract

Stroke is the fifth leading cause of death and is responsible for 10% of deaths worldwide. It is the leading cause for serious, long term disability in the United States. In this research, we used data from the Centers for Disease Control and Prevention (CDC), to compare differences in stroke mortality rate between race and gender. We then examined whether obesity increased the risk for death by stroke. We hypothesized that Blacks would have a higher mortality rate than Whites and Hispanics. We also hypothesized that males would have a higher mortality rate from stroke than females. Finally, we predicted that obesity would increase a person's risk for having a stroke. The CDC data was examined using ANOVA, two-sample t, and correlation tests to determine statistical significance between the variables. The results show that Blacks have a higher stroke mortality rate than Whites and Hispanics. There was no statistical significance between the mortality rates of males and females. Finally, the risk for stroke mortality increases as obesity increases within a population. Based on the results, we determined that increasing awareness programs that educate and promote healthy lifestyle choices in the populations studied is essential in lowering the stroke mortality rate.

An Analysis of Melanoma Risk Factors

Brayden Hay & Anne Pate

Abstract

This project aims to analyze data to find relations among different variables such as race, age, and gender among the population that has been directly affected by melanoma. We hypothesized that incidence and mortality rates would be higher in men than women; and that incidence and mortality rates would be higher in the white population than races with darker skin tones such as the black and Hispanic population. Data was retrieved from Centers for Disease Control and Prevention (CDC). Line graphs were made as a visual representation of the data. In order to test gender, we used a two sample t-test assuming unequal variances to test both the incidence and mortality rates of both genders. When comparing incidence and mortality rates among the male and female population we ended up with a p-value of 1.65×10^{-14} for incidence rates and 1.32×10^{-41} for mortality. When comparing both of these values to an alpha level of 0.05 we reject our null hypothesis and are able to statistically prove that males do in fact have both a higher incidence and mortality rate when compared to females. When comparing different races we find that males and females of the white population both have significantly higher melanoma incidence rates. Due to small counts in the other race groups we were not able to statistically compare the rates for this variable.

Phenotypic Plasticity in Freshwater Amphipods in the Genus *Hyaella*.

Connor Slattery

Abstract

This experiment was done to test the phenotypic plasticity of the freshwater amphipod in the genus *Hyaella* population of Roman Nose State Park at Watonga OK. Phenotypic plasticity is the ability for an individual to change its physical characteristics when presented with a new environment. This is an important evolutionary mechanism because it allows the individual organism to persist in a new environment within their lifetime. The Roman Nose freshwater spring system shows that the amphipods would likely experience movement between at least two very different environments, the pool of the spring and the adjacent run of flowing water that. To study this we collected individual of *Hyaella* from multiple spring's pools and runs as well as a sample of the invertebrate population of the springs to gain a better understanding of the differences in the environments. Measurements were collected to see if there are any physical differences between the spring populations. We then raised in the lab amphipods from each spring under standardized lab conditions to see if the amphipods show changes in their physical characteristics from each other and from the wild populations collected. If there are differences between the populations, there will be evidence for genetic differences.

Preliminary Investigation of the Ecology of Harris Mud Crab in Lake Texoma

David Bass, Jessica Neuzil, & Shelbie Weaver

Abstract

Harris mud crab (*Rhithropanopeus harrisi*) was first reported in Lake Texoma in 2008 and its distribution at that time was documented. Since that time, very little research regarding this population has been conducted. Purposes of the current investigation are 1) document current distribution, 2) estimate population size, 3) record sex and individual measurements, 4) determine reproductive periods, and 5) note microhabitat preferences and any other pertinent ecological information. Six sampling stations have been established on the Oklahoma side of Lake Texoma in a transect from the OU Biological Station to near the Denison Dam. Each site was sampled in August, October, and December 2019 (and will be sampled every other month through 2020). Crabs were found in plots ranging from 0.0 crabs/m² at Lake Texoma State Park to 27.5 crabs/m² at Lark Sandy Beach. No crabs were found in the December collection. Of the crabs returned to the laboratory, 26 were females, 31 were males and the remaining four were too immature to determine. Measurements including carapace width, carapace length, chela width, chela length, and dominant claw were recorded. Results from an independent study indicated 94% selected rock as a microhabitat over plants and sediments, confirming what was observed in the field. As this Lake Texoma mud crab project continues, it will be interesting to discover if these preliminary results establish a trend.

Rat Lung Worm, *Angiostrongylus cantonensis*, is its intermediate host native or invasive?

Amber Lemons

Abstract

Angiostrongylus cantonensis, commonly referred to as Rat Lung Worm, is an invasive zoonotic parasite that has been found in Common Brown Rats in south eastern Oklahoma in McCurtain County. The typical life cycle of this parasite includes a primary host of rats while the intermediate host is snails. Following research projects that have found aquatic snails to be an inadequate intermediate host for *Angiostrongylus cantonensis*, this project is aimed at determining if the intermediate host is still a non-native terrestrial snail, or whether the parasite has crossed the barrier into infecting native Oklahoman terrestrial snails. Given the proven potential of human infection by this parasite, in both Florida and Hawaii, this project can help determine the risk of contamination due to exposure to terrestrial snails and hopefully, slow the spread of these parasites across North America.

Evaluating the Effects of Habitat Restoration on Juvenile Recruitment in a Population of Sonoran Mud Turtles in Southwest New Mexico

Brooke Savoy & Sean Lavery

Abstract

Drought has impacted Southwestern New Mexico for nearly two decades, contributing to threats to biological diversity. In our study area, the Peloncillo Mountains, many artificial impoundments inhabited by Sonoran Mud Turtles, *Kinosternon sonoriense*, have fallen into disrepair. With the threat of continued drought, management is vital to maintain regional biological diversity. Restoration work was completed at two impoundments in the study area, Blackwater Hole and Buckhorn Tank in 2012 and 2015, respectively. We used long term mark-recapture data to analyze juvenile recruitment in the context of habitat failure and subsequent restoration and ask two questions: has recruitment increased in each study area, and are temporal changes in recruitment associated with aquatic habitat restoration? Data were analyzed from a 26 year ongoing mark-recapture study. Turtles were caught by hoop net in larger impoundments or by hand in shallow tanks and canyon pools, and were marked with a unique series of notches in the marginal scutes. The amount of captures in a given sampling occasion were analyzed for four different age groups (Hatchling, Juvenile, Female, and Male) before and after restoration at Blackwater Hole and Buckhorn Tank, and at a third site that did not undergo restoration, Javalina Tank. Preliminary capture data suggests that there has been an increase in juvenile recruitment in the past few years while male and female capture rates have remained relatively stable.