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Oklahoma Research Day

*Celebrating 20 years of Undergraduate
Research Successes!*

Abstracts

Southwestern Oklahoma State University
2019



2019 Poster Presentation Schedule

Poster Session 1 (10-11:30 a.m.)

Business Administration

- Accounting
- Business
- Economics
- Finance
- Information Operations Management
- Management
- Marketing

Education and Professional Studies

- Education
- Family Science
- Health Studies
- Nursing
- Physical Education
- Professional Teacher Education
- Radio and Television

Fine Arts and Design

- Art
- Dance
- Design
- Multimedia Design
- Music
- Theatre Arts

Liberal Arts

- Communication
- English
- Ethnic Studies
- Foreign & Modern Languages
- Geography
- Geology
- History
- Political Science
- Sociology

Mathematics and Science

Agriculture

Animal Science

Biology

Poster Session 2 (1:00-2:30 p.m.)

Mathematics and Science

Botany

Chemistry

Computer Science

Criminal Justice

Engineering

Environmental Science

Forensic Science

Genetics

Kinesiology

Mathematics

Optometry

Pharmacy

Physics

Psychology

Statistics

Zoology

On-site Registrants

Business Administration.Accounting.01

Aminet Aloba

University of Central Oklahoma

Credit Loss Model

Due to concerns from financial institutions and other organizations against the delay of recognizing credit loss, the Financial Accounting Standards Board (FASB) issued a new standard titled "Current Expected Credit Loss (CECL)". FASB requires organization to measure the expected credit loss at the reporting date based on historical experience, current conditions, and reasonable and supportable forecasts. This standard was issued to replace the "Incurred Loss Model"; and to accommodate early recognition of credit losses in a timely manner. However, would these organizations be able to determine the credit loss line item? What factors and variables would they have to put into consideration to estimate credit loss at a given point in time? The objective of this project is to devise a statistical model for financial institutions that gives an estimated credit loss amount. We proposed three new approaches to derive the estimate; the best of these alternatives will be selected. The theoretical model is based on a Cobb-Douglas elasticity structure. Preliminary findings indicate that the elasticity has significance at .01 level. As a result of the significance, last year's elasticity can be used to predict this year's expected loss. This approach is worthy of developing into comparisons by region, size and individual bank quarterly forecast analyses. The goal of this research is to derive the best loss estimation model for prior to the effective date of the st

Corporate Governance and Debt Selection

The amount of debt financing has been larger than the amount of equity financing. Despite the large size of debt issuances, almost all empirical studies of capital structure consider debt to be identical. Corporate governance is the system of rules, practices and processes by which a corporation is directed and controlled. The contractual relationship between management and finance is a substantial aspect of corporate governance. One fundamental element of corporate governance is the role of majority shareholders versus minority. Using data on the debt structure from SEC filings, we examine the relationship between corporate governance and debt selection. We specify debt structure in two ways: bank debt, bonds, program debt, private placements, convertible debt and other debts, and secured, senior unsecured, and subordinated debts. We measure corporate governance by ownership of top owners, blockholders and institutional investors ownership. We predict that strong corporate governance improves accounting information quality and decreases firm risk and default risk. Therefore, a well-built corporate governance will have less bank debts as the usage of bank debts is not essential to monitor the company and reduce information asymmetry. Additionally, since a decrease in default risk and information asymmetry reduces the usage of collateral, the proportion of secured debts, which are collateralized by assets, also becomes smaller.

Business Administration.Accounting.03

Edward Walker

University of Central Oklahoma

The Future of Governmental and Non-Profit Accounting Education: Guidelines for Educators

Governmental and Non-Profit (GNP) accounting is one of more complex areas of the profession. Yet, coverage in the accounting curriculum is limited to one elective course and possibly part of one semester in Advanced Accounting. This broad coverage does not address in depth some of the complex nuances of this area. This study explores topical coverage in the accounting curriculum by analyzing accounting syllabi. We will then compare the coverage with the topical coverage on professional examinations and then identify any gaps in coverage; we will also interview governmental accountants to gauge their opinions on how academia can better serve prospective employees in the GNP area. Finally, we will use this information to suggest revisions to the accounting curriculum.

Business Administration.Business.01

Marty Ludlum

University of Central Oklahoma

Textbook Usage: Results of a Student Survey

Are textbooks outdated? Do students buy/read/study the textbooks? Are open resources or online texts a solution? We surveyed students on their uses and attitudes towards college textbooks and report the findings.

Business Administration.Business.02

Smeyder Silvera

Southwestern Oklahoma State University

One Man's Trash is Another Man's Music

In her poster presentation, Smeyder Silvera of Paraguay will provide a detailed overview of a unique type of recycling based on her one-of-a-kind, naturalistic observation of children who dwell close to a landfill in Cateura, a slum alongside a landfill located not far from Paraguay's capital city, Asunci n. She will show how these children reframe the idea of trash. The presenter will also shed light on some of her most fascinating findings, which include how these children recycle trash into musical instruments, how they have formed a very successful orchestra, and how this ensemble supports the livelihood of 2,500 families who live near the landfill. Smeyder Silvera hopes to inspire and raise the audience's awareness on recycling.

Business Administration.Business.03

Therese Miller

University of Central Oklahoma

Morals Aside: The Relationship between Abortion and Crime

Access to family planning and abortions is a contentious subject. However, there are economic consequences related to this subject that may not be immediately apparent that are worthy of investigation. For example, when comparing abortion rates in Oklahoma to crime rates in Oklahoma, is there any correlation that could conclude that abortion rates and crime rates go hand in hand? Is there a delayed effect? In this research, I use data on abortions and live births by county in Oklahoma to compare abortion rates and the incidence of crime.

Business Administration.Business.04

Abidemi Olaoye, Suzanne Clinton

University of Central Oklahoma

Service-Profit Chain: Literature Review and Recommendations for Future Research Within the Restaurant Industry

The restaurant industry has historically struggled with poor management, low wages, and high employee turnover, all of which inevitably affect customer service and business results. Increasing pressure has been placed on the industry concerning the employee-employer relationship and organizations struggle to implement strategies that successfully address workforce concerns while continuing to optimize financial performance. Service management and service-profit chain literature have offered initial support for a framework in which employee perceptions influence customer perceptions of service, which in turn affect financial results. The theory is that, though there is a growing body of literature addressing these issues, there is a need for comprehensive literature review to generate optimized methods for future research within the industry. Torraco's (2005) integrative literature review was the method used to evaluate the literature. Multiple domains of literature were examined in support of this problem in order to meet the primary objectives of the study. In summary, this research synthesizes the service-profit chain literature to better refine the model, to evaluate the current gaps in literature, and to provide a research agenda that will help to produce new knowledge relevant to the restaurant industry's woes, while also contributing to the food service, human resource development, and marketing literature.

Business Administration.Business.05

Grace Merrifield

Southwestern Oklahoma State University

Social Media Image! The Good, the Bad, and the Ugly

The purpose of this integrative literature review is to explore the effects of social media on developing and maintain an organizational image. By synthesizing literature that addresses the relationship between social media and organizational branding, researchers aim to provide greater understanding of the published scholarship in this area. This review is important because social media presents a substantial opportunity for businesses who target specific audiences. Thus, contemporary business professionals need to understand how to harness the power of organizational branding via social media for maximum benefit.

Business Administration.Business.06

Grace Merrifield

Southwestern Oklahoma State University

Non-Profits: Where Are They Now?

As the world of business continues to evolve, non-profit organizations must find new ways to tackle the challenges within their unique segment of the marketplace. The purpose of this integrative literature review is to analyze current issues influencing the non-profit sector of business. By synthesizing the literature that addresses non-profit organizations, researchers provide organizational leaders with a comprehensive and contemporary understanding of the published scholarship in this area. Thus, this interactive literature review seeks to examine the opportunities and threats faced by non-profit organizations today.

Business Administration.Business.07

Jonna Myers

Southwestern Oklahoma State University

Exploring Collaboration between Different Generations in Business

The purpose of this integrative literature review is to explore ways to foster collaboration in multi-generational teams. By synthesizing the literature that addresses the management of different populations in the workplace, researchers provide organizations and leaders with a comprehensive, and contemporary understanding of the published scholarship in this area. This review is important because all generations bring different qualities and strengths into the workplace. Learning how to incorporate them into effective teams is important. To create successful work environments, organizations need to identify how members of different generations work together and what they value. Thus, this review seeks to address how to maximize generational differences for optimal collaboration in the workplace.

Business Administration.Business.08

Jonna Myers

Southwestern Oklahoma State University

Freedom of Opinion? Conforming to Your Organization

This integrative literature review seeks to explore if it is more beneficial to conform to the political beliefs held by your organization/supervisor, or to speak out for your beliefs. By synthesizing the literature that addresses political opinions in the workplace, researchers provide professionals with a comprehensive, and contemporary understanding of the published scholarship in this area. This review is important because it addresses whether business men and women can express their opinions within their organization, or what repercussions might befall them if they do. Should businesses promote individuality? This integrative literature review seeks to address that question.

Business Administration.Business.09

Jonna Myers

Southwestern Oklahoma State University

The Financial Impact of Advertising on Social Media

The purpose of this integrative literature review is to explore the financial benefits of using social media in business. By synthesizing the literature that addresses the relationship between advertising and social media, researchers provide business professionals with a comprehensive, contemporary understanding of the scholarship in this area. This review is important because social media is a powerful tool that can be wielded by businesses to reach larger audiences. Thus, business owners and managers need to find more efficient ways to market to social media users. This review seeks to maximize the potential revenue generated by social media marketing.

Business Administration.Business.10

Trey Borelli, JonnaMyers

Southwestern Oklahoma State University

Alcohol & Athletics: Untapped Revenue in College Sports

The purpose of this integrative literature review is to review the pros and cons of selling alcohol at collegiate sporting events. By synthesizing the literature that addresses the National Collegiate Athletic Association (NCAA) and rules and regulations pertaining to alcohol at collegiate sporting events, researchers provide college and university administrators with a comprehensive and contemporary understanding of the published scholarship in this area. This review holds major implications for revenue, attendance, and the overall NCAA rule structure. Colleges and universities need to find innovative ways of developing and maintaining world-class athletic programs. This integrative literature review seeks to highlight the potential benefits of incorporating alcohol sales into collegiate athletic events.

Business Administration.Business.11

Jonna Myers

Southwestern Oklahoma State University

Social Media Image! The Good, the Bad, and the Ugly

The purpose of this integrative literature review is to explore the effects of social media on developing and maintain an organizational image. By synthesizing literature that addresses the relationship between social media and organizational branding, researchers aim to provide greater understanding of the published scholarship in this area. This review is important because social media presents a substantial opportunity for businesses who target specific audiences. Thus, contemporary business professionals need to understand how to harness the power of organizational branding via social media for maximum benefit.

Neil Metz

University of Central Oklahoma

BEHAVIORAL BIASES IN COMPETITION:

EVIDENCE FROM PGA TOUR MATCH PLAY

The examination of behavioral biases has become increasingly popular and sports, in particular, provide a unique setting to study these biases. Several recent studies have used golf to examine behavioral issues ranging from loss aversion (Pope and Schweitzer 2011, Stone and Arkes 2016), to performance under pressure (Hickman and Metz 2015), and confidence (Rosenqvist and Skans 2015). This study uses PGA Tour ShotLink data to further examine the issue of loss aversion in the case of direct competition against another player, in the form of a match play tournament. We focus on the task of putting, and examine whether the performance of a player is affected by his standing (relative to his opponent) for both the current hole and the match overall. We find evidence that loss aversion bias is substantial in the match play setting, as player performance increases when in a losing position. The detailed nature of the data also makes it possible for us to examine how uncertainty in an opponent's performance impacts one's own performance.

HUIYING CHEN

University of Central Oklahoma

On The Welfare Implications of Nominal GDP Targeting

This paper examines the welfare implications of Nominal GDP level targeting (NGDP-LT), Nominal GDP growth rate targeting (NGDP-GT), Taylor rule and inflation targeting within a New Keynesian DSGE model. The paper finds that the ranking of policy rules depends on the measure of welfare, the degree of price stickiness and households' risk aversion. In general, NGDP-GT is either the preferable policy or the second-best regime. NGDP-LT and a traditional Taylor rule are dominated by NGDP-GT in the policy pool. Specifically, when using consumption equivalence as the welfare measure, inflation targeting outperforms other policy rules regardless of the levels of the price stickiness or households' risk aversion. NGDP-GT is proved to be the second-best regime. When using weighted sum of variances of inflation and output gap as the standard, the article finds no conclusive ranking. But when NGDP-GT is proved to be the best policy, inflation targeting turns out to be the least desirable regime. This paper contributes to the literature by employing two welfare measures to examine policy regimes more comprehensively; meanwhile, the simulation result renders as solid evidence to policy makers in the advantage of nominal GDP growth targeting.

Linh Pham

University of Central Oklahoma

How has the speed of energy transitions changed in the past 50 years? Evidence from the U.S. electricity sector

The electricity sector is the largest emitter of carbon and greenhouse gases in the U.S. Previous research has proposed a number of policies to decarbonize the electricity sector and promote the use of renewable energy. Yet, previous work in this area is often based on the assumption that the ease of substitution between renewable energy and fossil fuel is constant over time, thereby ignoring the rapid growth of renewable energy in the recent years. The goal of this project is to investigate how the transition from renewable energy to fossil fuel has changed over time and across regions and to evaluate the effectiveness of various environmental policies in decarbonizing the electricity sector. The empirical results suggest that the speed of transition between renewable energy and fossil fuel has increased over time, however, this speed varies across different types of renewable energy. Thus, environmental policies should consider the specific characteristics of each energy source, in order to effectively promote the use of renewable energy in the electricity sector.

Joseph Downs

University of Central Oklahoma

What factors influence Liquid Natural Gas trade?

Liquid Natural Gas (LNG) is an important commodity that is continuing to grow in the amount of consumption being used across the world. LNG is natural gas that is turned to liquid. There were 293.1 million tonnes of LNG traded throughout the world. This represented a 35.2% increase over 2016 and continues to reach record trade levels year over year. Since 2002 there has been an increase of over 100% in exports of LNG. There are significant investments by the United States into the trade of LNG, these investments are expected to have the United States be the third highest exporter of LNG. The top five importers of LNG are from Asia and account for 68.3% of the market alone. There are many factors to consider when attempting to analyze this type of trade. These factors include bilateral trade of LNG imports and exports, gross domestic product, consumption, production, distance and price. The studying of trade involving LNG is a relatively new topic with limited data and research. The purpose of this paper is to continue to build upon past research and study the factors that affect LNG import and exports. We will accomplish this task by investigating the factors listed by using an empirical research. This will let us know the significance of the factors that impact the pattern of LNG trade. I expect some factors to have a stronger weight to the reasons why trade of LNG trade is increasing year over year.

Tyler Clark

University of Central Oklahoma

Unconventional Market Behavior and Artificial Pricing in Steam's Online Gaming Marketplaces

Proposes an explanation and model for uncharacteristic market behavior of the Steam online marketplace for virtual tradeable items. The associated models correlate highly with symptoms of uncharacteristic patterns in market prices for virtual items that would otherwise obey consistent laws of supply and demand given their availability in a traditional marketplace. The associational models also correlate highly with attitudes in social interaction, particularly in regard to trustworthiness, item value competence, with the perceived social success of owning such an item. As the process of trading virtual items online through primary and secondary markets becomes increasingly interactive, this social interaction can become more volatile and deceptive. Because much trading and online interaction involves a working understand of the value of these items, successful trading requires personal interaction, shared experiences and access to resources that highlight factors that would otherwise inform a user of an item's value. The consequence of these trends in market trades is hyper-inflation within a virtual market, artificial prices, and predatory market manipulation. The final chapter traces the roots of this online market and highlights other authors' studies about market manipulation and monopoly, then concludes with an explanation of how a smaller scale policy approach could be taken by Valve Corporation to fix the externalities of their own online market.

Kuang-Chung Hsu, Zhen Zhu

University of Central Oklahoma

Tropical Storms, Weather, and Natural Gas Demand: How Have Hurricanes Impacted Gas Consumption?

In this paper, we study the impact of tropical storms on weather and the U.S. natural gas demand. Even though the general direction of the storm effect on gas consumption is known, no detailed analysis has been done to provide the magnitudes of the impact. We provide a detailed count of the effect of storms on temperature and natural gas demand by end use. Our empirical evidence shows that tropical storms decrease the temperature significantly by an average of 5-6 degrees with temperature drops ranging from 2 to 9 degrees on average for the regions we studied. The impact of summer temperature on gas demand is the strongest for power sector while the effects for other use uses are mixed.

Business Administration.Economics.07

Mart Gentry, Barclay Cheatham

University of Central Oklahoma

Energy and Temperature

In this poster I study the relationship between electricity use and temperature conditions. Specifically, I quantify how much energy use changes in each season relative to temperature anomalies. To explore this question, I use electricity demand data from the Southwest Power Pool, the Balancing Authority that manages electricity supply and demand in Oklahoma. I match this demand data with weather information from the National Centers for Environmental Information. The data suggests that electricity demand is in fact responsive to changes in daily temperatures.

Suvechhya Pokhrel, Travis Roach

University of Central Oklahoma

Finitely Repeated Games: Evidence from Wholesale Alcohol Markups and Changing Liquor Laws

In a finitely repeated game, it is expected that the competitive Nash equilibrium outcome of low prices or markups will occur when all players know the timing of the final stage of the game. In this research we examine a repeated pricing game that occurred for more than a decade between wholesale alcohol distributors in Oklahoma. In November of 2016, new liquor laws were voted on and adopted, but the new policies were not set to take effect for nearly two years. Using bi-monthly data from June 2007 to the enacting of new liquor laws in October of 2018, we show that firm behavior moved contrary to game theoretic expectations. Using this natural policy experiment setting, we show that wholesale markups steadily increased following the passing of the new law up until the final stage of the game, when the wholesale distribution system changed after the enacting of new laws.

James Pettigrew

University of Central Oklahoma

Obesity and Economic Freedom: State-level analysis

Several suggestions have been proposed to explain rising obesity levels around the world. Scholars suggest that mass production or industrialization leads to greater calorie consumption and less physical activity, resulting in the weight gain. Additional research suggests faster economic growth is the result of a greater economic freedom, thus establishing the link between economic freedom and weight gain. This study examines the relationship between obesity and economic freedom in the United States. Although the states are relatively similar when considering development levels, they are quite different in obesity trends. Therefore, mass production theory cannot be applied to explain the link between obesity and economic freedom when comparing individual states. We hypothesize that states differ in their approaches toward consumption and fighting obesity, resulting in varying obese populations. Our results suggest that states with a higher index of economic freedom have higher levels of obesity.

Mariya Burdina

University of Central Oklahoma

Grades as Reference Points: Impact on Performance and Motivation

According to prospect theory, decision makers adopt reference points and evaluate the outcomes in comparison to important reference points (Kahneman and Tversky, 1979). The outcomes that fall short of reference points are then treated as losses, and outcomes that exceed these reference points are then considered gains. This paper examines whether letter grades serve as reference points and if falling short of the next best grade during one test affects future test performance. In the college setting as many instructors use round numbers when determining the grading scale (i.e. a student needs to earn 70% to receive a C, 80% to receive a B, and 90% to receive an A). From our experience, most students are aware of this grading scale, thus they can judge which grade they have received on the test. The students who have achieved a desirable grade during the previous test, may not put as much effort into the next test compared to those for whom the goal grade has not yet been achieved. For example, a student who has received a score of 72 (narrowly receiving a C) on the test may perform differently during their next test than the student who has received a score of 68 (narrowly missing a C-grade). If round numbers, or, in our case, "next best grade" scores are influential, we would expect the student who has narrowly missed the "next best grade" to improve more than the student who has scored just above that score, all else equal.

Business Administration.Finance.01

David Chapman

University of Central Oklahoma

Privately owned public places - The good, the bad, & the ugly!

A group of University of Central Oklahoma students, faculty teamed with colleagues from Coventry University, in the United Kingdom, to research what is called Privately Owned Public Spaces (POPS). Urban theorists such as Lewis Mumford (1938), Jane Jacobs (1969), and Doreen Massey (1995) have all written about the importance of the public realm in defining cities and community culture. In these seminal texts, the authors suggest that cities make the biggest impact on community and culture in the public sector rather than private sphere. There is no doubt the public sphere is important, however there is another option available to municipalities as they navigate today's budget issues in building critical public infrastructure. Maintaining and securing open-air squares, gardens, and parks has become a burden for many cities. The option available to communities is the Privately Owned Public Spaces (POPS).

While the transfer of these government assets to private ownership is not without risk and controversy, it may be the only way forward to sustain the operations and maintain stewardship of these beautiful natural assets.

Business Administration.Finance.02

Han-ShengChen

Southeastern Oklahoma State University

An Experimental Study on the Impact of Active Trading to Investment Portfolio Performance

This study aims to explore the impact of active trading activities to the performance in the short-run. Using EquitySim, a virtual trading platform, a group of students are assigned an initial portfolio in financial sector based on the holdings of financial Select Sector SPDR Fund (XLF). Over an 8-week span, students are divided into two groups, where one group is required to have at least 10% turnover rate per week while the other is limited to 1% or less. To check the variability of the results, two groups will switch the objective after 4 weeks. That is, each group will have 4-weeks of active trading and 4-weeks passive trading. This experiment is designed to test the hypothesis that active trading causes higher volatility and lower expected returns on the portfolio. Thus, the returns and standard deviations of each students' portfolio will be examined and summarized

J. L.Hsu, I-Lin Huang

Langston University

A Cognition Model of Story Driven Object Modeling

The quality of requirement specifications is crucial to the success of an information system development project. Numerous studies have shown that incorrect and missing information requirements will lead to serious problems in the later phases of an information system development. Requirement analysis is an error prone process, especially for novice information analysts. It is believed that weak cognitive ability of novice information analysts is the most important cause for low quality of requirement specifications. Studies have shown that human beings learn best from stories. Stories can provide more complete and detailed information requirements in a form appealing to human cognition and hence impose lighter cognitive load on novice information analysts. Storytelling has therefore been recommended as an effective tool in the communication process of requirement analysis. However, it is still unclear that how the stories can be transformed into structured requirement specifications such as object models from the perspective of a novice information analyst. By literature review on cognitive research, this study proposes a cognitive model of requirement analysis on the basis of storytelling to build a high-level object model as requirement specifications. Future research directions are also explored on how to use the cognitive model to improve the performance of novice information analysts in generating more complete and correct requirement specifications.

Marie Uwamahoro

University of Central Oklahoma

The Rise of Virtual Care in Employer Sponsored Health Care Benefits

As healthcare costs continue to rise, employers have been actively looking at alternative options to decrease these costs, such as shifting costs to employees through consumer-driven health plans, private exchanges, accountable care organizations, and more. Due to improvements in technology, one other option that most employers are now providing to their employees through their health care benefits plans is virtual care, also known as telehealth. Virtual care provides access to a health care provider remotely through the phone, video or online, and provides physician consultation and management of chronic conditions, and other conditions as well. Employers are attracted to virtual care because of its potential to reduce costs, increase worker productivity, provide easier access to physicians, and generate savings for both employers and employees. Studies show that all large employers will cover telehealth services for their employees by 2020. Hence, it is important to know the foundation and effectiveness of virtual care. This paper will explore the rising trend of virtual care as a health benefit by providing a review of various studies of the effectiveness of virtual care on improving population health and its impact on employer-sponsored health plans. The results of these studies mainly demonstrate that telehealth is an effective alternative to traditional visits, as it provides immediate access to care, which in turn, positively impact employee productivity and satisfacti

Nathan Tayero

University of Central Oklahoma

THE INFLUENCE OF PEER MENTORING ON FIRST-YEAR BUSINESS STUDENTS' CHOICE OF MAJOR AND ACADEMIC SUCCESS

The purpose of this research is to determine the factors students will consider before they a) agree to peer mentoring and b) determine whether a peer mentor is a reliable guide to their choice of major and their academic success upon completion of their program. The proposed method used in this research is the survey method. Data will be gathered from first-year students in the College of Business at the University of Central Oklahoma. The survey seeks to obtain data about student perception, willingness, and considerations to agree to peer mentoring. The questionnaire seeks to test each individual's opinion about the value of peer mentoring. Therefore, multiple regression analysis will be used to examine these outcomes. The research hypothesis is that freshmen perception and willingness to be mentored by senior peers will be a significant predictor of their choice of major and academic success.

Patricia Blevins, Veronica Cowan, Brittany Savage

University of Central Oklahoma

Distraction or Not? The Study of Cellphone Use in the College Learning Environment

Cellphone usage by college students has increased tremendously over the past decade as technologies have advanced. Most college students have a cellphone within their reach in their classes. Typically, there is a perception of faculty members frowning at any type of cellphone use in the learning environment. But could these devices really be beneficial to the learning environment? Or are these devices just a distraction as historically been presumed? This study attempts to discover how cellphone usage is perceived in a college environment and whether usage should be encouraged in the classroom. A survey of college students comprised of different classes, genders and ages were asked about personal cellphone usage, distractions in the classroom and faculty cellphone guidelines within the classroom. This study tests the expected theory students do not consider cellphones a distraction in the classroom. The study also assumes most faculty members do not encourage cellphone use of any type within their classrooms. It attempts to discover how students are using their devices within the classroom in a beneficial way to their learning experience. Can their cellphones be integrated within a classroom environment as a valuable tool for learning or will these devices always be considered a distraction?

Patrick Pellegrino

University of Central Oklahoma

Amazon Web Services: A Benefits Analysis of a Cloud-Based Computing Service

The arrival of cloud-based computing services, such as Amazon Web Services (AWS) is changing how organizations implement systems and services. Organizations now have an option to reduce IT costs with third-party cloud services for off-premise storage and computing. Every business, large or small, can use cloud services to fit their unique requirements ranging from basic off-premise disaster recovery services to fully outsourced mission-critical systems as a software as a service (SaaS) architecture. Other potential benefits include fewer specialized IT personnel such as system administrators, server and storage technicians; and fewer, less complex contracts. Properly employed, AWS and other cloud service providers can reduce the cost of software, hardware, facilities, and support compared to traditional in-house data center operations.

Business Administration.Management.01

Ramanuja Vokkarane

University of Central Oklahoma

Behavior-based Interviewing and Gamification as a Selection Tool: Acting and Playing Your way Into Employment

This review of literature of behavior-based interviewing and gamification in selection explores the application of behavior-based interviewing and gamification to the employee selection process. The purpose of the paper is threefold. First, the paper provides a review the literature including numerous studies conducted on behavior-based interviews to attempt to identify the best way to interview. Second, the paper provides a review the literature concerning gamification in interviews to attempt to identify the best methods of applying gamification in interviewing. Finally, the paper will attempt to establish guidelines for employers to use as they implement behavior-based interviews and gamification into their selection process. The general consensus in the literature is that behavior-based interviews are designed to elicit specific answers from candidates which are more useful and instrumental in the selection process. Similarly, gamification principles are used to intensify interviewees' interest in the company and deepen their engagement in the selection process. This review recognizes themes in the literature among various studies that illustrate that behavior-based interviewing and gamification have grown tremendously in their applications as methods of employee selection. There is a general positive perception and favorable attitudes toward behavior-based interviews and gamification from employers.

Business Administration.Management.02

Hongguo Wei

University of Central Oklahoma

Impacts of compassion on giver's and receiver's well-being:

The role of self-serving and other-oriented motivations

Despite the increasing scholarly attention on compassion at work, the various motivations accompanying compassionate acts and the corresponding impacts on the focal actors (i.e., the person doing compassion) and the sufferers experience and well-being have been overlooked. To address the question of how focal actors motivation relates to the focal actors and the sufferer's experiences and well-being (e.g., felt meaningfulness, job stress, giving to others, felt emotional support, recovery related self-efficacy), we examine self-serving (e.g., fulfill job expectations, seek incentives, avoid punishments, and desire to improve reputation) and other-oriented motivations (e.g., alleviate the sufferer's suffering, benefit the broader community/organization) as well as the levels of authenticity in the compassionate process. We adopt the between-subject experimental design. Participants are randomly assigned to one of the two conditions (self-serving vs. other-orientation). Specifically, in experiment 1, we examine how focal actors; self-reported motivation; self-serving and other-oriented; accompanying the act of compassion relates to their felt meaningfulness at work. In experiment 2, we examine how sufferers' perceptions of focal actors' motivations; self-serving, other-oriented, and authenticity; accompanying the act of compassion relate to the sufferers; experience and well-being at work.

Hongguo Wei

University of Central Oklahoma

Impacts of compassion on focal actors; and sufferers; well-being:

The role of self-serving and other-oriented motivations

Despite the increasing scholarly attention on compassion at work, the various motivations accompanying compassionate acts and the corresponding impacts on the focal actor's (i.e., the person doing compassion) and the sufferer's experience and well-being have been overlooked. To address the question of how focal actor's motivation relates to the focal actor's and the sufferer's experiences and well-being (e.g., felt meaningfulness, job stress, giving to others, felt emotional support, recovery related self-efficacy), we examine self-serving (e.g., fulfill job expectations, seek incentives, avoid punishments, and desire to improve reputation) and other-oriented motivations (e.g., alleviate the sufferer's suffering, benefit the broader community/organization) as well as the levels of authenticity in the compassionate process. We adopt the between-subject experimental design. Participants are randomly assigned to one of the two conditions (self-serving vs. other-orientation). Specifically, in experiment 1, with data collected from mTurk, we examine how focal actors' self-reported motivation's self-serving and other-oriented's accompanying the act of compassion relates to their felt meaningfulness at work. In experiment 2, we examine how sufferers' perceptions of focal actors' motivations's self-serving, other-oriented, and authenticity's accompanying the act of compassion relate to the sufferers' experien

Gender Wage Gap; Is Pay Transparency the Answer?

Women earn 77 cents for every dollar earned by their male counterparts (DeGette and Sanders, 2012). Although women are afforded more professional opportunities than ever before in history, the reality is that they still earn less than men. The reason behind this difference is the Gender Wage Gap. Though there are a lot of mixed factors contributing to the Gender Wage Gap, pay secrecy has been found to be one of the main reasons for the Gender Wage Gap. If, on the other hand, there was transparency, everyone would know their colleagues' pay, and any kind of bias in pay would be evident. The organization would be forced to make appropriate decisions regarding the pay discrepancy. Many studies advocate that pay transparency can help close the wage gap (Elesser and Childers, 2018). The literature also highlights that the availability of pay comparison information keeps organizations honest in making pay decisions (Elesser, 2018). Pay secrecy indirectly affects pay satisfaction and the quality of work (Gaertner and Brinkman, 2018). When employees assume they might not be getting paid as much as someone else, they tend to decrease their job performance (Belogolovsky, 2016). This paper concentrates on how the disclosure of pay information acts as a key resource that reduces information asymmetry and helps with closing the Gender Wage Gap. The paper also discusses the factors that cause the Gender Wage Gap and the pros and cons of pay transparency.

Brayden Battershell

East Central University

A Presidential Leadership Profile and its Application for Business Professionals

On November 30, 2018, America lost its 41st President of the United States. At the age of 94 years old, President George H. W. Bush was the oldest living President in United States history, and he exemplified a true American leader. Serving from 1989 to 1993, Bush lead America through several famous and important world events, including Operation Desert Storm, the cessation of the Soviet Union, the end of the Cold War, and the Invasion of Panama. In this paper, the leadership behaviors, techniques, and styles of George H. W. Bush are examined and analyzed. Through an analysis of his roles, foreign policy, relationships, diplomacy, presidency, and life, several core leadership behavior patterns can be found. These patterns used by the President can be used in almost any business setting. When applied correctly, such behaviors can produce favorable results, whether it's improved job satisfaction within a business organization or a successful military operation. This analysis into the leadership of President George H.W. Bush can prove beneficial to any leader.

Jace Zacharias

Southwestern Oklahoma State University

How the Oklahoma City Thunder Utilize Their Social Media to Compete with Larger Markets

Oklahoma City and Boston are two different markets with large differences in population and economic activity. However, with the use of Instagram by the Thunder, they are able to keep up in likes and followers compared to a larger city like Boston. By analyzing the Celtics and the Thunder's Instagram accounts, and comparing their types of posts per week, it will show whether a varying difference of posts contribute to a higher fan interaction. . This study will analyze how many times on average each team posts each week which will prove the hypothesis that the amount of posts per week on Instagram can lead to the same amount of fan response as a larger market like Boston.

Analyzing the Thunder and Celtics posts per week can show many more examples of how even though Oklahoma City is a much smaller market than Boston, they continue to keep up with those larger markets. Lastly, the number one factor in identifying a successful Instagram account is by analyzing the likes per photo. This factor will be another tool used in this study to show how the amount of posts per week, and what types of posts they are contribute to the amount of likes per photo. This study will prove how Oklahoma City is succeeding in a smaller market compared to Boston.

Business Administration.Management.09

Jason Eliot

University of Central Oklahoma

Giving Away A Brand New Car - A Look at the Return on Investment for An Innovative Employee Referral Program

Employers implement creative employee referral programs to differentiate themselves from competitors and attract and retain new employees in tight labor markets. This study evaluates the effectiveness of an innovative employee referral program through which a company provides one employee every year a two year lease to a brand new car for referring what the employer has designated a hard to recruit employee. The study looks at the return on investment of the program exploring the costs versus the benefit. It also evaluates the effect on turnover and compares the employer to the industry average while comparing the program to other creative employee referral programs. The poster will highlight a history of the program and provide visual representations of the study's findings.

Business Administration.Management.10

Sommer Roach

Cameron University

Implications of #MeToo on Business Students' Perceptions

Recent media coverage of high profile sexual harassment scandals and subsequent #MeToo publicity confirms continual issues related to sexual harassment in today's workplace. Our research objectives were to examine if business students felt that #MeToo has changed perceptions regarding workplace misconduct and has influenced the development of anti-harassment cultures. We anticipated that the #MeToo movement has provided emerging professionals with increased knowledge and resources regarding workplace harassment. In Fall 2018, 45 college juniors and seniors volunteered to participate and completed a survey of 12 questions designed to (a) determine students' expectations of their future employers regarding harassment training, (b) discover students' familiarity of social media anti-harassment movements, and (c) examine how students would anticipate handling sexual harassment violations. Students indicated a variety of preferred reporting methods including sources within and outside of businesses. Findings also indicated that students felt that increased training (more than yearly) from internal and external sources was recommended to address anti-harassment cultures.

Elin Wahlin

Southwestern Oklahoma State University

Evaluating Strategies top Golf Brand Manufactures use to Promote Technological Advances

Social media is an essential tool for golf brand manufactures to promote their products and reach their target audience. With their social media channels, and specifically Instagram, the companies can create creative strategies to build a connection with their customers and effectively market their new technological advances. The objective for this research is to analyze how top golf brand manufactures uses different strategies on Instagram to promote technological advances in their products. The authors use content analysis researching the last 50 posts of each of the golf brand manufactures' Instagram posts. Researching the Instagram content of three golf brand manufactures, Taylormade, Cobra and Callaway, have given the results that each of these brands have strategies that successfully promote their products. Each company uses the 'Shopping on Instagram' tool, giveaways, hashtags, creative videos, and professional golfers to promote their products. Instagram is an important tool for top golf brand manufactures to promote their technological advances.

Schyler Ridgeway

Southwestern Oklahoma State University

Evaluating the use of Facebook Post During the Month of December by Airline Companies; American Airlines, Delta, and Southwest Airlines

Many companies in the airline industry use social media in hopes to come in contact with potential customers whom they will provide services for. The objective of our research is to seek and analyze information regarding the top U.S. airlines Facebook pages, such as American Airlines, United, and Southwest airlines, to see how each one uses different promotional strategies to increase potential future customers as well as interact with them. There is a correlation between the amount of Facebook posts, likes, replies, and the number of potential customers each airline has as a follower on Facebook. To research the reach of Facebook posts, a content analysis will be conducted. This analysis will provide information on how frequently posts are created on each airlines Facebook page and the average amount of interactions on each post.

Results show and compare how these three top airlines are able to use strategies to promote sales throughout the holiday season. Furthermore, it offers and provides great strategies for companies to consider implementing into their social media policies and strategies during the holiday season to promote sales. The Facebook pages for each of these airlines has millions of followers. American Airline has 2.4 million, Delta has 3.1 million, and Southwest Airlines has approximately 6 million followers.

Tyler Freeburg

Southwestern Oklahoma State University

A Descriptive Study of International Posts on the Official NBA Twitter Page in the Last Five Years

There are 108 international players on the NBA opening roster for the 2018-19 season and each of the 30 teams in the league currently have at least one international player. The purpose of this research is to analyze the posts of the official NBA Twitter page regarding international players and foreign countries. It is hypothesized that the number of NBA Twitter posts about international topics has increased in the last five years as a result of the increase in international players in the league.

The methodology used in this study is a content analysis utilizing data mining practices. Data will be shared from the official NBA Twitter account for any mentions of foreign countries or international players. Data will also be shared from the official NBA website for the signing dates of international players in the last five years. NBA rosters have become increasingly diverse in relation to the countries represented and this research investigates how the NBA promotes this international growth via Twitter.

Business Administration.Marketing.06

Shelbey Trawick

Southwestern Oklahoma State University

Less Than Entitled: Analyzing Oklahoma's Preparedness for the Next Generation Through Corporate Social Responsibility

With Generation Z (Gen Z) coming to the age of being active participants in the job market, it is important for companies to consider if their marketing efforts align with the generations values. Due to Gen Zs familiarity with the internet, they have been regularly interacting with people and companies across the globe, and they are quick to bring attention to a companys perceived shortcomings. In this content analysis, Oklahomas 27 largest employers were audited to determine their preparedness for a Gen Z work force. Each companys website was searched for key corporate social responsibility components (e.g., sustainability reports, codes of ethics, etc.), mimicking Campopiano and De Massiss content analysis of corporate social responsibility programs in 2014. Results show that a large majority of these companies do have several corporate social responsibility components on their websites. However, some of those components are not as accessible on some websites as they are on others.

Business Administration.Marketing.07

Reece Buckmaster

Southwestern Oklahoma State University

EVALUATING INSTAGRAM PROMOTIONAL STRATEGIES OF LIVE MUSIC VENUES IN OKLAHOMA CITY

Abstract

Research has shown some event venues struggle with turning their online community into ticket sales. Social media promotion is a way to get people involved and convinced to buy tickets. The goal of this research is to investigate the use of Instagram to more efficiently promote and attract ticket sales for live music events. Due to companies; inability to translate online interaction into sales, live music venues in Oklahoma City should use Instagram more efficiently to promote ticket sales for events. Researchers conducted a communications audit for Instagram accounts of four live music venues in Oklahoma City. The venues included in this audit are The Criterion, The Jones Assembly, The Blue Door and The Tower Theatre. The initial research showed some types of Instagram posts had a positive impact on sales by engaging online followers, while some types of post were not as successful.

Business Administration.Marketing.07

Lexi Clark

Southwestern Oklahoma State University

Identifying Underlying Dimensions of Customer Needs

One main reason that the firms design and implement various kinds of give-and-take marketing exchange activities with target customers is to meet multiple unmet needs mostly driven by the presence of their body system. Given that, the firms have utilized various types of marketing research techniques in order to identify unmet needs of target customers. As an example, the customer roadmapping method has been used to identify and select key customer needs as the input for the firms; product development activities. However, an implicit assumption for the success of this task is the requirement of a theoretical framework which describes the existence of universal customer needs dimensions as a reference point for comparison and starting point. In this regard, the goal of this study is to identify a set of underlying dimensions of universal customer needs as the critical input for the subsequent planning activities of the firms. For this matter, this study utilizes two methodological approaches: the review of literature in relevant disciplines to identify a set of customer needs and the application of our theoretical framework into selected cases to exhibit how the firms create their products, services, or retail stores. Our findings indicate that this study casts marketing insights into the design of various products, services, or retail settings for the firms.

Stefanie Guerrero

Southwestern Oklahoma State University

Evaluating the Marketing of THE SPRINGS Event Venues of Oklahoma: a Content Analysis of Facebook Pages

THE SPRINGS Event Venue is a wedding venue that has a unique mission to provide personal touch to their clients by being flexible, interacting with consumers online and educating the everyday viewer. THE SPRINGS Event Venues connects with engaged couples by updating and maintaining their Facebook pages and unifying their brand. A content analysis was created to assess the differences among each of the three Oklahoma location pages. Integrated communication will be considered to improve the formats of the 2018-2019 data given from the Facebook pages. Consumers expect the same quality of engagement and information within a given company no matter the separation of physical locations.

The authors will analyze data from the Facebook pages of THE SPRINGS Event Venues by looking at the following metrics of each page: likes, followers, efficiency to customer questions, reaction time, ratings and recommendations, number of events in specific time periods of the year, number of weddings total, the differences and similarities of each Facebook page, and the number of posts made each month. THE SPRINGS Event Venues needs to consider creating a more unified Facebook outlet as it expresses their accountability, reputation, transparency, and customer service. Findings conclude that most details within each page are uniform. However, discrepancies exist with the tools available, photograph depository, and online Facebook community interactions, such as members, comments, and reviews.

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Business Administration.Marketing.12

Cheyenne McMullin

Southwestern Oklahoma State University

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Bailey Patton

Southwestern Oklahoma State University

How Using Instagram Could Help Boost Pet Adoption in the Oklahoma City Metro Area.

Animal shelters tend to focus on using social media to promote new animals that need adopted. While many adoption shelters keep their Facebook updated often to connect with families, another social media platform could hold new bounds. Instagram could have a new potential when marketing to families and people who are looking to adopt pets. Instagram is one of the fastest growing social media sites, and these pet adoption centers could use this to their advantage. When examining nine pet adoption centers in the OKC area, only two use Instagram.

Using Instagram could help boost the number of interactions and number of people who see these animals daily. Another factor that could boost the number of people who engage in these posts could be the format and time of day that these are posted. While most use Facebook, Instagram could possibly double the number of people who interact with these animals in need. This study will show pet adoption centers how they could maximize the number of animals adopted by posting daily and maintaining an Instagram page daily.

Theresa Billiot

Cameron University

Reframing One's Fear of Needles: An Exploratory Study Combining the Elaboration Likelihood Model with Reflecting on One's Self Versus Others to Persuade People to Donate Blood

With less than 10% of the U.S. population annually donating blood, blood banks consistently campaign to attract new donors to ensure accessibility to blood for immediate transfusions. However, the fear of needles serves as a barrier to convert people into life-saving heroes. By examining ones fright and anxiety toward blood donations, this exploratory studys purpose is two-fold: First, we evaluate if an advertisement which positions respondents to make a choice between receiving the positive results of donating blood versus facing the negative consequences of not giving blood can influence intentions to become blood donors. Second, we seek to discover if positioning respondents to reflect on ones self versus others (i.e. best friend) motivates them to become blood donors. A conceptual model is designed based on the elaboration likelihood model. This study has implications for marketers, nonprofits, hospitals, and society as a whole.

Carlie McKinney

Southwestern Oklahoma State University

Content Analysis of the Facebook Pages of Property Brothers, Fixer Upper, HomeTown, Rehab Addict, and Flip or Flop of HGTV to find the Correlation Between Profit and Popularity.

In most cases, the more popular a TV show is, the more profit it brings in. The purpose of this study is to determine if high popularity on Facebook correlates to a high rate of profit for the television series. According to Statista.com, HGTV has a total of 755,000 viewers per day and approximately \$2,740,000 in daily revenue. Social media marketing is one tool that is being used by nearly every television network to promote shows and viewer growth. A content analysis was created over the individual pages covering categories such as number of followers, number of likes on their page, and how often do they post a day. Over the current season, the five television shows have had 399 posts, 90 for Property Brothers, 237 for Fixer Upper, 13 for HomeTown, 40 for Rehab Addict, and 19 for Flip or Flop. Of these shows, Property Brothers has a net worth of \$20 million, Fixer Upper has \$16 million of net worth, HomeTown has \$5 million net worth, Rehab Addict has \$7 million net worth, and Flip or Flop has \$8 million of net worth. These results show that there is correlation between the number of posts and their net worth. For example, Property Brothers and Fixer Upper have the highest number of posts and they both have a significantly larger net worth than the other three shows.

Christy Brown

Southwestern Oklahoma State University

Assessing Social Media Marketing Campaigns of Weatherford, Oklahoma Herbalife Nutrition

Revive Nutrition, New Creation Nutrition and FIT Nutrition are Herbalife Nutrition Clubs located in Weatherford, Oklahoma. These clubs, while simultaneously providing similar services and products, lack individuality in branding. We investigated the Facebook pages of all three Herbalife Clubs in order to research how each club utilized their Facebook platforms to create individual brand identities. We evaluated the social media patterns within the span of three months of all three pages. Our findings highlight the importance of using various social media marketing strategies in order to establish brand identities. For example, FIT Nutrition, the club containing the least amount of Facebook likes of the three, has the most interaction with their content. Their promotional sales and interactive posts gain the most attention compared to the content of the other Weatherford clubs. Revive Nutrition, New Creation Nutrition, and FIT Nutrition need to consider variety in their social media marketing to gain and maintain a brand identity--this would create brand recognition and promotional awareness. Creating unique content, implementing consistent branding strategies, and utilizing the various resources within selected social media platforms are the keys to building a brand identity. Research shows, when combining these three major factors, consumers are more motivated to build loyalty.

Business Administration.Marketing.17

Jeanetta Sims, Karen Anderson, Mindy Vo

University of Central Oklahoma

Exploring Brand Identity among Non-Innovation District Cities

Innovation districts are comprised of entrepreneurs, educational institutions, and companies that come together to stimulate economic and community development in cities. Using a content analysis of top large urban U.S. city websites, this research examines innovation-related symbolism of branding and marketing strategies in non-innovation district cities. A comparison of research results with ongoing previous research will provide insight on how non-innovation district cities promote themselves through branding efforts when compared with innovation district cities.

Business Administration.Marketing.18

Jeanetta Sims, Karen Anderson, Mindy Vo

University of Central Oklahoma

An Examination of Brand Identity through Educational Tie-Ins in Innovation District Cities

In innovation districts, educational institutions and business firms strongly influence social and economic trends while creating a fertile space for creativity and innovation to flourish. Using a content analysis of university websites, this research examines university tie-in efforts to their respective innovation districts via branding and marketing strategies employed and the choices of social media platforms utilized. Research results will assist universities in shaping curriculum and in improving university and innovation district interactions and relations.

Education and Professional Studies.Education.01

Ed Cunliff, Shannon Dennis

University of Central Oklahoma

Changing Lives to Change Communities – Transformative Learning and Community Development

Building communities through transformative experiences is the over-arching goal of the Possibilities, Inc. nonprofit organization. It truly embodies the concept of transforming individuals and communities and does most of its work through a program called Possibilities Innovation Program (PIP). PIP trains volunteers to work as community developers in their own communities. The program positively impacts both the individuals and the communities they live in, not only through a yearlong educational program, but through an on-going connection to PIP graduates and the communities they live in. PIP is a leadership training program in Oklahoma City that works with individuals and helps them move through alternative perspectives and reflective practice resulting in changed world views and more connected communities. This work describes the program and a replicable model for program evaluation.

Education and Professional Studies.Education.02

Jessica Altz, Cheryl Evans

University of Central Oklahoma

More Alike Than Not: Educational Leadership in K-12 and Higher Education

Aim/Purpose: This research is intended to expand on the limited study of leadership development across three areas of educational leaders: K-12, higher education professional (not in academics), 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 over 600 educational leaders equally distributed across these three areas. We will soon be sending a new electronic survey to current educational leaders 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 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.

Education and Professional Studies.Education.03

Courtney Shelly

University of Oklahoma

Information Seeking Behaviors of Undergraduate Students within Special Collections and Archives

This paper discusses information seeking behaviors of undergraduate students within the context of special collections and archive spaces. Many factors contribute to the use of special collections by undergraduate students including: feedback from trusted sources, research starting points, and outreach services offered by special collections and archives. An anonymous professional reference librarian who works in a special collection at an academic university was interviewed and current trends and literature were consulted to further dive into this little researched subject area. Ultimately it was concluded that undergraduate students are unlikely to pursue research at special collections libraries due to the separation between these institutions and the student's small world context - as discussed by Elfreda Chapman.

Susan Benson, Jessica Stewart

University of Central Oklahoma

Instructional Methodologies for Increasing Explicit Grammar Knowledge in Speech-Language Pathology Students

This study continues a multi-year, multi-site investigation of instructional format for e-learning, self-paced modules designed to increase explicit grammar knowledge in Speech-Language Pathology (SLP) students. It applies principles of cognitive theory of multimedia learning and investigates an instructional format using embedded sentence diagramming. Specifically, we asked: 1) Are e-learning, self-paced instructional modules that include embedded sentence diagramming more effective in increasing explicit grammar knowledge in Speech-Language Pathology students than e-learning, self-paced instructional modules without sentence diagramming? 2) Does the response to instructional format (with or without embedded sentence diagramming) differ by educational level of the student, i.e., undergraduate versus graduate? 3) Does the response to instructional format differ by type of grammar form or function (nouns, verbs, phrases, clauses, etc)? Inferential and descriptive statistics were used to assess the impact of the independent variable (instructional format with sentence diagramming) on the dependent variable (performance on a quiz measuring explicit grammar knowledge) for two levels of students and across four grammar types. Results added to the current literature exploring instructional practices in preparing SLP students to serve individuals with communication difficulties.

Tayler Smith

Southwestern Oklahoma State University

Benefits to Prison Reform Programs

Prison Reform is an attempt to improve the conditions of prisons across the country. Prison Reform is also a way the government can find an alternative to incarceration, which could reduce the overcrowding prison populations in the United States. Prison Reform can also benefit those who have been incarcerated that have not committed a heinous crime. Other alternatives to prison are community service, probation, rehabilitated services and restitution. Prison reform could help those who have been convicted of nonviolent and non-serious offenders. Those who fail to follow the alternatives to incarceration will then be given prison or jail time.

Prison Reform could be beneficial to the justice system by giving those in prison a second chance, which would allow them to see their families without being behind bars and giving them the opportunity to turn their lives around.

Elizabeth Daley

Southwestern Oklahoma State University

The Death Penalty and Women

The death penalty is served to mainly male offenders. There are a considerably fewer amount of women who have received the death penalty and been executed. During my research of the general topic of capital punishment and the death penalty, I began to wonder if women are let off the hook easier than men. The statistics of women versus men executed are overwhelmingly small. The death penalty was suspended in 1972 due to the United States Supreme Court case *Furman v. Georgia*. Only 16 women have been executed since 1976, when the death penalty was reinstated, out of 1490 executions total (DeathPenaltyInfo.org, 2018). This presentation will delve into the history of the death penalty, previous cases, and demographics behind women and the death penalty.

Nadine Wander

University of Oklahoma Health Sciences Center

Exploration of JUUL and Other Tobacco Product (OTP) Use Among Current Marijuana Users

Use of marijuana and other tobacco products (co-use) is common. The use of JUUL, a new e-cigarette has increased significantly in the past two years. This study explored use patterns of marijuana, other tobacco products (OTP), and co-use of JUUL. 263 U.S. adults registered on Amazon Mechanical Turk who reported JUUL ever-use and indicated past 30-day use of marijuana, completed survey items assessing JUUL use, OTP use, state legalization status of marijuana, age of first use of marijuana, self-reported nicotine dependence (ND) and disordered marijuana use (DMU). Differences were examined between tobacco use status (JUUL+OTP user vs. JUUL-exclusive), marijuana legalization status, DMU, and ND, respectively via independent samples t-tests. The majority of the sample were JUUL+OTP users (68%), reported marijuana use for an average of 14 days per month for an average of 4 months. JUUL+OTP users reported significantly greater DMU ($M = 9.19$; $SD = 6.34$, $t(261) = 2.40$, $p = .02$) and ND ($M = 1.47$, $SD = 2.42$, $t(261) = 2.59$, $p = .01$) compared to JUUL-exclusive users (ND, $M = 7.36$, $SD = 5.69$; DMU, $M = .77$, $SD = 1.90$). State marijuana legalization was associated with increased DMU ($M = 9.2$, $SD = 6.5$, $p = .005$). No differences were observed in age of first marijuana use ($p = .28$) by legalization status. Overall, JUUL+OTP users reported greater ND and DMU compared to JUUL-exclusive users. Users in states with legalized marijuana also reported greater disordered marijuana use.

Morgan Dunsmore

University of Central Oklahoma

Reflective Quizzes and the Development of Dispositional Autonomy

The project aims at transformative learning by using reflective essays for the development of dispositional autonomy. The goal of education should be to offer students more than mere details and facts they could gain from reading a textbook. Success in education should include the result of the student being able to apply material he/she deems important to his/her life. This study emphasizes that through reflective writing assignments students generate a stronger grasp of dispositional autonomy. This later translates into self-awareness, critical thinking, and empathy through inquisitive introspection. During phase one participants were recruited from my mentors two general psychology courses, with total participants not exceeding 85. Everyone in these classes completed the assessments, but only those that provided consent were included in the study. Each student completed the course which included one reflective writing assignment each week. A sample question of the reflective one-page papers would be, "Imagine your life if you beat your worst fear, what would it be like?" The reflective quizzes were collected and graded by the professor as is currently done as a part of his pedagogical approach and are not a part of this study. At the end of the course students will complete the assessments completed on the first day. Analyses will be ran to identify whether or not the reflective papers were useful in increasing scores of autonomy.

Trevor Cox

University of Central Oklahoma

Practicing Inclusion for Transformation: Building Skills and Theory for Cultivating Inclusive Transformative Learning Environments

This poster presents research done on the kind of environment or container required for the development of Inclusive Leadership. Drawing on a basic qualitative study of 23 diverse faculty members, the research contributes to both Transformative Learning theory and practice by drawing on transdisciplinary frameworks to describe what is needed to create more inclusive and transformative environments. Participants in the study were chosen based on their capacity for inclusive teaching and care was taken to choose a diverse sample with a heavy population of marginalized identities.

Using the findings of the study, this presentation will illustrate and describe the container which must be created for generative dialogue across differences. Such a container requires brave space equal ground, room for mistakes, and resilience through tension. Each of these elements will be richly described and will reflect their importance for inclusive, transformative environments. Creating such a container also requires various methods, skills, and capacities which will be explored. Leaders must establish ground rules, model vulnerability and not knowing, engage social identity, bring in multiple perspectives, share power, navigate conflict, and address exclusion. Inclusion requires transformative educators to create relational responsibility in the community and ask whose voice is missing. Again, each of these areas will be explored as critical element

Vincent Pinion, Zachary Knepp

University of Central Oklahoma

Using Self-Persuasion to Reduce Academic Self-Handicapping

This experiment uses self-persuasion (based on cognitive dissonance theory) to reduce academic self-handicapping (ASH). There are two methods of ASH: behavioral and claimed. Behavioral self-handicapping describes self-sabotage in an academic setting as a result of behaviors detrimental to academic performance. Claimed self-handicapping describes being subject to a situation that could negatively affect academic performance. Both instances can result in externalization of academic failures and internalization of successes which perpetuates ASH and protects the self-esteem. The utilized method of self-persuasion is based off cognitive dissonance theory. When a participant is compelled to comply with a scenario that causes a disparity between attitudes and behaviors, the following attempt to resolve the disparity results in a behavioral change. In this experiment, each participant in the treatment group is told to lie to a confederate, telling them that they do not self-handicap when prompted by the confederate with the incentive of four dollars for their compliance. In order to resolve the inconsistency between what the participant practices and what they preach, a behavior change resulting in lowered measurements of ASH is hypothesized. A questionnaire measuring ASH will be administered before the dissonance and 2 – 3 weeks following the dissonance to measure the effect. The treatment group scores will be compared to a control condition.

Education and Professional Studies.Education.11

Mary Springfield, Tanja Knezevic, Mike Nelson

University of Central Oklahoma

Embodied Brain Education: An Interdisciplinary Investigation of the Implementation of Mind Brain Education in Higher Education Classrooms

The field of neuroscience has informed our understanding of how the structures of the brain work and how neurons and neural pathways are related to cognition, emotions, and well-being. Less understood is how findings from neuroscience research can be implemented in higher education classrooms to support students' engagement in transformative learning. The goal of this project was to investigate the implementation of Mind Brain Education (MBE) practices in higher education classrooms and their relationship to students' self-reports of motivation, self-regulation, cognitive engagement, and well-being. Eight instructors across five disciplines participated in the study. Students read *The New Science of Learning* (Doyle & Zakrajsek, 2013) and instructors implemented class activities based on the content presented in the book. The poster presents preliminary findings of students' changes in motivation, self-regulation, cognitive engagement, and well-being. In addition, lessons learned and instructional activities will be shared and the audience will have an opportunity to engage in discussion with some of the participating instructors.

Hannuja Vijayan

University of Central Oklahoma

The intervention of Affective Empathy Training will be Effective in Altering Dark Personality Traits.

Abstract

The purpose of this study is to examine if the intervention of affective empathy training will be effective in altering dark personality traits. In this current study, individuals will complete the short dark triad. After participants complete the short dark triad, those with higher scores in one or more personality trait will be asked to be a part of the intervention training. First, participants will be shown normed pictures of individuals from the IAPS. When shown the image, participants must first identify the emotional state of the individual. Next, while looking at the image, participants will be asked to try and take that other perspective in the situation. Finally, participants will be asked to share in the emotional response in the image through affective discrimination and role-taking. After training is complete, participants will complete the short dark triad a second time to assess if there were shifts in dark personality traits. In other words, the effectiveness of the empathy training intervention can be assessed with short-term shifts in personality traits. Research has shown that those who are higher in dark personality traits tend to show a lower amount of affective empathy towards others.

Brent Stafford

University of Central Oklahoma

Gamification as a Music Education Strategy to Guide Students Towards a State of Flow to Improve Quality of Independent Practice Time.

Music educators have a limited amount of time with students necessitating the fostering of independent learning skills that lead to effective practice time outside the classroom. Poor independent learning skills can lead to a student practicing music in a chaotic, unfocused manner or not practicing at all which can cause the student to progress poorly as a musician and fail to meet their learning goals. Flow Theory provides the educator with a perspective for helping a student approach practice at home in a productive way. Csikszentmihalyi, notes that flow tends to be impeded when individuals lack goals, immediate feedback, and a chance to use their skills. We hypothesize that strategies like gamification aligned with the Flow Theory perspective can improve the quality of student independent practice times.

This case study observed five students in a private music instruction environment in which the classroom was transformed into a music studio. Students were given the opportunity to choose songs of their choice and the instructor transposed and simplified the songs to their current skill level in accordance with their learning objectives. Daily rules and rewards were created to provide motivators and structure to the gamified classroom. At the end of a 4-month period we interviewed students and parents, identifying several themes that illustrate an improvement in practice quality and student engagement with music.

Stephen Gibson

Cameron University

Mathematical and Engineering Tutoring: The Effects on Student Grades.

The objective of this research study was to indicate the extent in which mathematical and engineering tutoring in Statics influences student grades. The research question of this study were: To what extent did student grades improve in response to tutoring? To what frequency did students need tutoring in the subject of Statics? Is there a correlation between the frequency of tutoring and student grades? This research study was confined to the month of February to indicate a concise time frame. Within this time frame, results will be recorded through the Statics course in the Engineering Department at Cameron University. To conduct this study, students that receive tutoring will be logged into visitation records and have their corresponding grades for the month of February recorded. This methodology will be used to indicate the extent in which student grades improved and identify possible correlations between the amount of visitations and grades being produced. This study hypothesizes that student grades will improve due to tutoring visitations while identifying a positive correlation between the frequency of visits and grade improvement.

Joshua Hawkins

Northwestern State University

Valuing Experienced Educators

In Oklahoma, the teacher shortage is profound. As a result, districts are increasingly relying on unqualified or under-qualified individuals to compensate for this deficit. Further, qualified and effective experienced educators are voluntarily leaving the field despite the teacher shortage. Using qualitative methods of data collection and analysis, we explored five experienced educators perceptions of the value of education, of themselves as educators, and of experience generally as it relates to effective teaching. Preliminary findings indicate that commitment to the field relates to personal history, perceived effectiveness, professional support, and opportunities to re-invest knowledge acquired through experience. Additionally, the ability and willingness to adapt practices to meet the changing needs of students and communities contributed to the participants continuing in the field. Finally, the participants consistently reported that they felt valued and valuable in the variety of educational roles they held.

Elbin Gonzalez

University of Central Oklahoma

Life History Theory and Social Connection

Nostalgia involves reliving meaningful experiences such as those involving relationships. Nostalgia can help reestablish a symbolic connections with significant others (Sedikides, Wildschut, Arndt, & Routledge, 2006), effectively counteracting reduced perceptions of social support triggered by loneliness (Zhou, Sedikides, Wildschut, & Gao, 2008). Prior research reveals that slow-life strategists think of more distant past events when assessing their lives, than do fast-life strategists (Choi & Suh, 2018). Further, given that slow strategists engage in more mutualistic social behaviors (Wenner, 2010) and focus on establishing stable social connections (Figueredo et al., 2018), they would likely care more to be socially connected. Therefore, we will examine whether slow-life strategists use nostalgia more than do fast-life strategists to cope with disconnection from others. We will first measure participants' life history strategies, then manipulate their feelings of disconnection from others (i.e., loneliness), and measure any subsequent nostalgia.

Angela Keeler, Todd Parker

Southwestern Oklahoma State University

Developing Curricula in College-Level Art History Courses Using Student-Centered Learning

The use of different learning styles to help students more fully engage in class sessions at the college-level is a concept that has been shown to facilitate greater in-depth understanding of subjects. Student-centered learning is an instructional method that recognizes students learn best when they are primarily responsible for learning and redirects the focus away from instructors, generally considered experts. An instructor thus acts as facilitator of learning rather than conduit of information.

This study will address uses of student-centered learning teaching methods to develop curricula for a class session in an upper-level Non-Western art history course at Southwestern Oklahoma State University. In preparation for the class session over the Inka city of Machu Picchu, student-centered learning teaching methods will be used to develop curricula appropriate for undergraduate students. Curricula developed for the class session could include uses of auditory, visual, kinesthetic or other learning styles which best address students needs as learners.

Klemson Lancaster, Todd Parker

Southwestern Oklahoma State University

Developing Curricula in College-Level Art History Courses Using Student-Centered Learning

The use of different learning styles to help students more fully engage in class sessions at the college-level is a concept that has been shown to facilitate greater in-depth understanding of subjects. Student-centered learning is an instructional method that recognizes students learn best when they are primarily responsible for learning and redirects the focus away from instructors, generally considered experts. An instructor thus acts as facilitator of learning rather than conduit of information.

This study will address uses of student-centered learning teaching methods to develop curricula for a class session in an upper-level Non-Western art history course at Southwestern Oklahoma State University. In preparation for the class session over Polynesian tattoo art, student-centered learning teaching methods will be used to develop curricula appropriate for undergraduate students. Curricula developed for the class session could include uses of auditory, visual, kinesthetic or other learning styles which best address students' needs as learners.

Sydney Riddle

University of Central Oklahoma

Measuring Implicit Attitudes Toward Racial Stereotypes in Internet Memes Using Facial EMG

Because of rapid, global increases in the use of digital technology combined with the ability to share information, beliefs, and ideas instantly, empirical research focusing on these processes is vital. Social media provides researchers with a novel setting for studying social psychological phenomena such as bias and stereotypes. The proposed study will investigate attitudes toward racial stereotypes in internet memes. Participants will view memes conveying white and black stereotypes while implicit attitudes are measured using facial EMG at the corrugator supercilii, the facial muscles involved in frowning. Drawing on social identity threat, implicit attitudes should be more negative when viewing memes depicting in-group stereotypes compared to out-group stereotypes, resulting in increased corrugator activity.

Education and Professional Studies.Health Studies.01

Austin Johnson, Sheridan Evans, Matt Vassar

Oklahoma State University

Statistical Significance and Orthopaedic Traumatology

Purpose of Study:

A recent proposal suggests changing the threshold for statistical significance from a P value of .05 to .005 to minimize bias and increase reproducibility of future studies. The present study explores how lowering the P value threshold would affect the interpretation of previously published trauma orthopaedic randomized clinical trials (RCTs) and whether outcomes from these trials would maintain statistical significance under the proposed P value threshold.

Methods:

All RCTs published between January 01, 2016 and January 31, 2018 in the Journal of Orthopaedic Trauma, Injury, and Archives of Orthopaedic and Trauma Surgery screened by at least 2 authors. Data from included trials were extracted in blinded and duplicate fashion.

Results:

We identified 117 primary endpoints from 49 trials: 41 endpoints (35.0%) had a P value less than .05 and 76 (65.0%) had a P value greater than .05. Overall, 41.5% (17/41) of statistically significant primary endpoints were less than .005. Of the 117 primary endpoints, only 17 (14.5%) of the endpoints were less than .005, and would hold significance with the proposed threshold. Only 6.12% (3/49) of the included studies had all primary endpoints that met the new threshold of .005.

Conclusion:

Based on our results, adopting a lower threshold of significance would heavily alter the significance of orthopaedic trauma RCTs and should be further evaluated and cautiously considered.

Education and Professional Studies.Health Studies.02

Taylor Hughes

Oklahoma State University

Analysis of Yoshihiro Sato's Falsifications and their Impact on Orthopedic Surgery

Austin Johnson

Oklahoma State University

An Analysis of the Use of Systematic Reviews to Justify Otolaryngology Randomized Controlled Trials - Is Research Being Wasted?

Objective of Research:

Current medical research is plagued by redundancy and research waste. One such source of research waste derives from failing to use a previously conducted systematic review (SR) to indicate whether conducting a new randomized controlled trial (RCT) is indeed warranted or needed. The purpose of our study is to explore the level of adherence to guidelines and where a literature search was incorporated and documented SRs were used as justification for conducting a RCT and the amount of research waste as a consequence.

Methods and Results:

We performed a meta-epidemiological cross-sectional study of RCTs published in top peer reviewed otorhinolaryngological journals according to Google Scholar Metrics. We recorded whether or not that study used the cited systematic review as justification for conducting the trial. Of the 304 articles retrieved, 151 were included. Overall, only 58.3% (88/151) of studies referenced a SR while shockingly, 41.7% (63/151) articles did not reference at all a systematic review. Possibly even more alarming is the fact that only 27% (24/88) that did cite at least one SR mentioned the SR as justification for conducting the trial and only 17% (15/88) of studies cited verbatim that a SR implicated the need for a RCT to further gaps in knowledge.

Conclusion:

Based off of our findings, we recommend that efforts be taken to reduce research waste by using systematic reviews and meta-analysis as justification for conducting RCTs.

Cara Daniels, Larissa Boyd

University of Central Oklahoma

To Stress or Not to Stress: The Relationship Between Perceived Stress and Cholesterol

Background: Stress has been shown to result in adverse health outcomes including poor cholesterol. Previous research provides that an individual's perceived stress may greatly influence lipid levels. Purpose: The purpose of this study was to determine the relationship between cholesterol and perceived stress. Methods: A volunteer sample of full-time faculty and staff of the University of Central Oklahoma were administered the Perceived Stress Scale (PSS; N=47) which is a 10-question survey of perceived stress over the last month. Blood lipid profiles were also taken for the measurement of high-density lipoprotein cholesterol (HDL; N=38), low-density lipoprotein cholesterol (LDL; N=38), and total cholesterol (TC; N=39). For this measurement, each participant was fasted for 8-12 hours. The relationship between perceived stress and cholesterol levels were examined using a Pearson's Product Moment Correlation. Results: A significant relationship was found between LDL and perceived stress ($r=-.32$, $p=.05$) as well as TC and perceived stress ($r=-.33$, $p=.04$). No relationship was revealed between HDL and perceived stress ($r=-.08$, $p=.65$). Discussion: While previous research revealed adverse physiological outcomes due to stress, this study found an inverse relationship between perceived stress and cholesterol levels. Further research is needed to understand the magnitude of the relationship between cholesterol and perceived stress.

Constance Haynes, Larissa Boyd

University of Central Oklahoma

The Relationship Between Work Productivity and Physical Activity Participation

Increasing demands and higher expectations on employees could lead to lowered workplace productivity. The purpose of this study was to determine if a relationship existed between work productivity (WP) and physical activity (PA). Volunteer faculty and staff (N=37) at the University of Central Oklahoma were given surveys to self-evaluate their PA and WP. WP was measured using the 11-item Health and Work Performance Questionnaire (HPQ) to evaluate relative and absolute absenteeism and presenteeism. Absenteeism is a comparison of expected and actual hours worked and presenteeism is a comparison of possible and actual performance. Participants were also given a 27-item International Activity Questionnaire (IPAQ) to evaluate PA levels for walking (WA), moderate (MO), and vigorous (VI) intensity (METmin/wk). A Pearson-Product Moment Correlation was used for analysis. No relationship existed between all variables ($p > .05$). The lack of relationship between WP and PA suggests that one's ability to be productive or come in to work may not be linked to their physical activity level. This is contradictory to past research demonstrating PA may have an impact on work productivity and attendance. Further research should objectively measure the relationship between workplace productivity and physical activity.

Levi Brown, Kanika Bhargava

University of Central Oklahoma

Fortification of Nutrient Lacking Sourdough Bread with Nutrient Dense Cricket Powder

Consumers are constantly searching for new food items to supplement into their diet. When searching for these items, one of the main nutrients that consumers look for is protein. Cricket protein is an environmentally friendly and high-quality option when it comes to protein supplementation. The popularity of fortified foods is rising and this product looks to take advantage of that trend.

The purpose of this research was to test the effects of fortification of sourdough bread with cricket powder. This experiment tested both the physical and chemical changes associated with cricket powder fortification to determine the potential for this to be a viable product in the market. Fortification percentages of 5 and 10% were used and multiple tests were run. Tests were conducted on fortified flour samples to see the effect of the cricket powder on flour characteristics, and also on the baked bread itself.

The results from the tests showed differences in many of the physical characteristics of the bread such as percentage rise, firmness and color. The largest differences were found in the percentage rise and color tests. Tests were also run on the properties of flour mixed with cricket powder. These tests were emulsion stability and solubility percentage. These tests did not elicit as big of a difference as the bread tests, but there were common trends in each depending on the level of fortification with cricket powder.

Austin Johnson

Oklahoma State University

The Use of Systematic Reviews in Orthopaedic Traumatology

Purpose

Systematic reviews (SRs) are an invaluable resource that can be used to justify whether or not there is a need to conduct a new randomized controlled trial (RCT). New RCTs are warranted when previous SRs cite a lack of evidence in literature. The primary aim of this study is to evaluate the use of SRs as justification in conducting RCTs published in high impact orthopaedic trauma journals.

Methods

We analyzed RCTs published in the top three high impact orthopaedic trauma journals. Data was extracted by the number of SRs cited in each RCT. Each citation was analyzed for justification in conducting the trial. Citations found to be verbatim directly cite a lack of sufficient information specified in a SR as the purpose for conducting the trial.

Results

Of the 144 trials retrieved, 128 were included. Overall, 70.3% (90/128) of trials referenced a SR while 29.6% (38/128) did not reference a SR. Of these 128 trials, 23% (30/128) cited at least one SR as justification for conducting the trial, with most found in the introduction (16/30). Therefore, 76.6% (98/128) made no reference of SR guiding RCT design.

Conclusion

Based on the findings of this study, SRs are not being sufficiently cited as justification for conducting a RCT in orthopaedic traumatology. Trialists may consider using evidence from existing SRs for designing RCTs to combat performing duplicative trials.

Kelsey Bishop

University of Central Oklahoma

Diversity in Human Sexual Attitudes, Preferences, and Behaviors

Currently, there is no objective standard of sexual behavior. Aside from sexual behaviors that are classified as illegal or dangerous, such as those behaviors that intentionally harm non-consenting individuals, human sexual behaviors are difficult to classify into categories of atypical versus typical. The purpose of this study is to examine the differences in sexual interests, attitudes, behaviors, self-consciousness in sexual contexts, sexual satisfaction, perceptions of openness in communication with a sexual partner, and sexual desire across non-BDSM practicing population as compared to populations of individuals within BDSM/fetish communities. With further knowledge in this area, sex researchers and therapists would have a clearer understanding between a paraphilia and a paraphilic disorder.

Education and Professional Studies.Health Studies.11

Hope Shreve, Tate Odam, Marshall Wallace, Haley Zellner

Southwestern Oklahoma State University

Awareness and Utilization of Available Food Resources for Undergraduate Students in Western Oklahoma

Food insecurity is defined by the U.S. Department of Agriculture as a household having limited access to adequate food due to a lack of money or other resources. Oklahoma has seen a 1.6% rise in the percentage of food insecurity to the current 15.5% level in the most recent report. Recent research focused on college students have found even higher levels of food insecurity. The goal of this study was to assess the awareness and use of available food resources among Southwestern Oklahoma State University (SWOSU) students in Weatherford, Oklahoma. The researchers contacted known resources to determine address, hours, types of resources, frequency of visits, and what qualifications must be met to receive assistance. The researchers developed a survey that included questions on demographics, academics, ten standardized questions from the U.S. Household Food Security Survey Module, and awareness and use of food resources available to SWOSU students. The survey will be administered online and available for two weeks. After the survey concludes, the researchers will distribute food resource information via email, social media, and printed advertisements. The results of the survey will be analyzed in order to determine an effective marketing plan in hopes of raising awareness of resources.

Donovan Cousan

University of Central Oklahoma

Using PhotoVoice Research to determine Health Equity issues

Health equality is more so offering the same services to individuals whereas health equity is every person given a fair chance to achieve the highest form of health status without there being barriers established due to the social determinants of their health. These determinants of health can be in various categories such as education, access to health care, transportation, food desserts, and housing editions. The state of Oklahoma is experiencing a lot of health equity issues, more specifically on the east side of Oklahoma City in the zip codes 73111 and 73105.

The purpose of this research project was to create a plan of action addressing the health equity issues in Oklahoma City and share the results broadly in the community. The research involved participants who were raised or currently living in the zip codes listed above, this was important for it gave prominent leaders the opportunity to hear from the individuals who were personally affected. The PhotoVoice research project consisted of photos taken by eight participants who were given digital cameras to take pictures of the social and built environment that they felt played a part in the health inequity concerns. After the images were received, individual interviews were then held to hear personal narratives and descriptions about each photo. The research was later displayed as a gallery to pinpoint the barriers that the individuals living in those communities felt brought hindrance to them obtaining the best health

Dusten Lynn, Bethany Bates

Southwestern Oklahoma State University

Mortality and Incidence Rates for Leukemia in the United States from 2012-2016: An Exploration of the Demographic Variables: Sex, Income, and Ethnicity

Leukemia is often thought of as a cancer that affects more children than adults. However, Leukemia is a genetic condition that is linked back to an abnormal chromosome. In this study, we examined specific demographic variables (i.e., income, sex, and ethnicity) in order to compare incidence and mortality rates in various populations. We hypothesized that American Indian and Alaskan Native would be at a higher risk for the development of Leukemia in the United States as opposed to African Americans and Caucasians. Also, we wanted to know if the mortality rates for Leukemia are higher among males. Our third hypothesis examined if poverty had an influence on the United States mortality rates. The authors analyzed the data using correlation tests and two-sample t-tests to determine if there was any significant difference between the variables. The two-sample t-test was used to conclude whether males or females were at a higher risk. The correlations were done in Excel to analyze any statistical significance in our data. Results show poverty level status is not associated with Leukemias mortality rate yet sex, specifically being male correlates with mortality. Moreover, ethnicity, particularly American Indian and Alaskan Native (AI/AN) males are at greater risk for the development of this disease. Therefore, greater awareness of other possible predictors may help early identification of this illness in certain populations.

Education and Professional Studies.Health Studies.15

Mason Beard

Southwestern Oklahoma State University

How Social Media/News Media affects Jurors in Trials

I am covering how news media and social media affects jurors in trials. In high profile trials and cases, news media and social media portray what they want to portray and show only what they want to show to convince listeners of their side. Sadly, in today's society jurors go into trials with preconceptions already in their head about what they believe. I will be covering many high profile trials that have been influenced by the Media and also interviewing an Oklahoma Official on his take on the subject.

Education and Professional Studies.Health Studies.16

Michael McKaig

University of Central Oklahoma

Speech and Language Therapy for Weaver Syndrome

We describe in this study a male with Weaver syndrome who received treatment for delayed speech-language development for a period of 13 months, from the age of 1:11 to 3:0. Although his performance remained below chronological age norms, significant gains were noted in receptive and expressive language skills. We believe this is the first report of disordered communication in a recognized case of Weaver syndrome.

Emily Jost, Christina Brady, Tom Darling

Other

Resistance Training Effects on Cancer Symptom Severity

Cancer rehabilitation increases functional capacity (FC) and health-related quality of life (HRQOL). Resistance training (RT) contributes to enhanced physical and mental functioning. PURPOSE: Examine RT effects on cancer symptom severity (CSS). METHODS: 8 Cancer survivors (CS) and 2 caregivers (CG) participated in a 12-week (45-60min/session) cancer rehabilitation program (OBU CARES, 2017-2018) at Oklahoma Baptist University. Sessions included various RT exercises (i.e., body-based, TheraBand, weighted balls, dumbbells). Hand-grip (pre/post) measured muscular strength. Symptom Severity Inventory (SSI) determined CSS. FACIT-SP (v4) evaluated HRQOL. RESULTS: 3 CS and 1 CG completed the program. CS1 (Pre=38 kg, Post=43 kg) increased muscular strength. CS1-3 and CG1 reported enhanced CSS scores. CONCLUSION: RT may have positive effects on physical functioning, mental functioning, and HRQOL. Further study will determine specific RT effects on CSS.

Mckenzie Bohannon, Katherine Kuehn, Tom Darling

Oklahoma Baptist University

Remote Exercise Monitoring for Cancer Rehabilitation

Cancer rehabilitation increases functional capacity (FC) and health-related quality of life (HRQOL). Remote sensor technology and exercise monitoring may enhance exercise safety and effectiveness and cancer rehabilitation program integrity. PURPOSE: Examine the use of the Zephyr BioHarness in monitoring and analyzing physiological, biomechanical, and biomarker indicators throughout exercise. METHODS: 8 Cancer survivors (CS) and 2 caregivers (CG) participated in a 12-week (45-60min/session) cancer rehabilitation program (OBU CARES, 2017-2018) at Oklahoma Baptist University. Participants were monitored remotely via the Zephyr BioHarness, monitoring 7 live parameters (HR, %HRmax, HRV, BR, activity level, core body temperature, posture) and 23 additional parameters recorded in the database. RESULTS: 3 CS and 1 CG completed the program. 5 CS and 3 CG were included in the analysis, completing exercise sessions 65 to 85; 85% HRmax. Zephyr software works best on a Windows-based system. Biosensor conductivity is dependent upon BioHarness fit and position, sensor wetting or use of hydrogels, and participant body composition. Data accuracy is dependent on percent HR confidence (>80%). Participants indicated that the Zephyr BioHarness was comfortable throughout exercise activities. CONCLUSION: The Zephyr BioHarness is a promising system for safely and effectively monitoring exercise for cancer rehabilitation programs. Further study will determine additional applications.

Nathan Hall, Tom Darling, Brooklynn James, Monique Mossop

Oklahoma Baptist University

Exercise Effects on Cancer-Related Fatigue

Cancer rehabilitation increases functional capacity (FC) and health-related quality of life (HRQOL). Exercise may have positive effects on cancer symptom severity (CSS) and cancer-related fatigue (CRF). PURPOSE: Examine exercise and cancer rehabilitation programming effects on CRF. METHODS: 8 Cancer survivors (CS) and 2 caregivers (CG) participated in a 12-week (45-60min/session) cancer rehabilitation program (OBU CARES, 2017-2018) at Oklahoma Baptist University. Sessions included a combination of aerobic/anaerobic, resistance training, flexibility, and neuromotor exercises. Modified Bruce ETT, hand grip (HG), Timed Up & Go (TUG), and sit-and-reach (S&R) measured FC. FACIT-SP (v4) evaluated HRQOL. RESULTS: 3 CS and 1 CG completed the program. CS improved FC scores (CS1: TUG=0.56s, ETT=20s, HG=5kg; CS2: TUG=1.0s, ETT=2m 50s, S&R=1cm; CS3: TUG=1.8s, ETT=3m, S&R=3cm). CG1 did not complete post-testing. CS1-3 and CG1 reported enhanced CSS scores (e.g., CRF). CONCLUSION: Exercise may have positive effects on FC and HRQOL. Further study will determine specific effects on CSS and CRF.

Austin Johnson

Oklahoma State University

The Use of Systematic Reviews to Justify Orthopaedic Clinical Trials- An Analysis of Research Waste

Objective

As much as 85% of biomedical research is estimated to be wasted or of little use. This has led to \$170 billion of wasteful research spending annually worldwide. One method to combat research waste by avoiding duplicative or unnecessary studies is to conduct randomized controlled trials (RCTs) only when a systematic review (SR) suggests more data are needed. The primary aim of this study is to evaluate the use of SRs as justification in conducting RCTs in orthopaedic literature.

Methods

All RCTs published between January 01 2015 and November 31, 2018 in 5 high impact Journals chosen for analysis based on the most recent 2018 Google h5-index rankings were analyzed and screened by at least 2 authors. We recorded the number of SRs cited in each RCT and analyzed for justification in conducting the trial.

Results

Of the 390 trials retrieved, 320 were included. The data extraction process identified 777 total SR citations in the 320 included trials. Overall, 74.4% (238/320) of trials referenced a SR while 25.6% (82/320) had no references to a SR. Analysis of the 320 trials showed that 35.6% (114/320) cited at least one SR as justification for conducting the trial, with most such citations found in the introduction (86/114). Ultimately, 64.4% (206/320) made no reference of SR guiding the design of the RCT.

Conclusion

Based off of our findings, we recommend that efforts be taken to reduce research waste by using SRs as justification for conducting RCTs.

Stephanie Nutter

University of Central Oklahoma

A Study on Voice Disorder Knowledge in High Risk Majors

The objective of this study is to determine the current level of pre-professional knowledge pertaining to voice disorders and vocal hygiene practices among at-risk majors. At-risk majors include Education, Theatre, and Voice performance majors due to their intense voice usage in their future occupations (Cohen et al., 2012; Fritzell, 1996; Miller & Verdolini, 1995; Thibeault, Merrill, Roy, Gray & Smith, 2004; Williams, 2003). In this particular presentation we will assess Music Education student's vocal hygiene and voice disorder knowledge. The student's level of knowledge will be assessed using a multiple-choice question survey that has twenty questions relating to voice disorders and vocal hygiene. The collection of data is important in order to determine if a change in the amount of pre-professional knowledge of voice disorders is needed. This knowledge will be used to create an advocacy plan for these populations. Currently, there is minimal research investigating pre-professional knowledge in at-risk majors. Our results will be discussed in the context of a descriptive analysis of the data, the average survey score for the population as a whole, and describing specific questions that were missed by more than 50% of the population.

Khoa Nguyen, Ngan-Dinh Nguyen, Tashrique Rahman, Lucero Villa

Southwestern Oklahoma State University

Evaluating Naloxone Access and Prescribing Requirements in the Opioid Epidemic Across the United States

Introduction: Deaths related to opioid overdose has been an increasing problem in the United States. In 2016, over 42,000 people died from opioid related overdoses. Deaths related to opioid overdoses can be prevented by the use of naloxone which reverses the effects of opioids. Approaches to promote naloxone access have been described by federal agencies, including the Substance Abuse and Mental Health Services Administration. The objective of this study is to examine which states require physicians to prescribe naloxone to patients receiving opioids, which states allow pharmacists to prescribe naloxone to patients, and layperson access. Methods: Using national and state databases, information was collected and analyzed for each state regarding the requirements of concurrently prescribing naloxone with opioid prescriptions. We also analyzed naloxone access in community pharmacies for each state. Finally, we assessed which states allowed layperson access through naloxone hubs without a prescription. Results: Currently, all 50 states and the District of Colombia allow physicians to prescribe naloxone for patients at risk of opioid overdose. Conclusion: Changing laws have helped make naloxone easier for people to access this life-saving medication by increasing how it can be distributed beyond traditional prescriptions. Increased access allows individuals at risk, as well as friends and families of those at risk, be prepared in the event of an opioid overdose.

Saleena Brownell

Southwestern Oklahoma State University

The Impact of Naloxone Training and Education in the Community

Introduction: The issue of opioid overdose has become a national crisis and is receiving a lot of attention in the media. In the state of Oklahoma, an excess of 900 people (approximately 3 per day) succumb to overdose. Nationally, there were over 42,000 opioid-related drug overdose deaths in 2016. The objective of this study is to determine the impact that education and training have on attitudes and confidence of people in the community to have the ability to recognize and respond to an opioid overdose using naloxone.

Methods: Student pharmacists and preceptors will present information about opioid overdose awareness, people who are at risk, how to recognize an opioid overdose, and how to respond to a situation where someone has overdosed. This education also provides training on using intranasal naloxone. Surveys will be conducted both prior to and after the presentation to determine the impact that the education had on knowledge and confidence in using intranasal naloxone in an opioid overdose situation. Surveys from various student groups are being collected, and data from the pre- and post-survey will be compared. Data from the different groups will also be compared to identify how participant background affects survey data.

Bradley Johnson, Tomi Adewumi

Oklahoma State University

Use of Systematic Reviews in Preventing Research Waste in Emergency Medicine Randomized Controlled Trials

Remarkably, an estimated 85% of wasted medical research results in billions of research dollars wasted each year. (Chalmers and Glasziou, 2009) Systematic reviews are a well-recognized methodology for mitigating research waste. Studies have shown that a portion of randomized controlled trials in medicine have not used SRs properly. In the field of emergency medicine, there has been no studies conducted over this problem. This study's goal is to find out if randomized controlled trials in emergency medicine research included a SR, and to see if those trials that did include SRs used them as justification for their study. We searched PubMed for studies that were published between 01/01/2014 and 12/31/2017. This search resulted in 615 studies. We found that 275 of them fulfilled the requirements of a RCT. The bibliographies of the 275 studies were analyzed for evidence of SR citation. If a SR citation was present, we determined if information from the citation was used to justify the RCT. Of the 275 studies, we found that 66%, 95%, and 74% studies did not use SR citations as justification or did not have SR citations at all in the introduction, methods, and discussion sections respectively. The results from this study reveal that there is a lack of justification for RCTs in emergency medicine research due to the underutilization of meaningful SR citations. Trialists in emergency medicine should be more proactive in citing SRs in their studies to prevent wasted resources.

Olivia Anders

Southwestern Oklahoma State University

Alzheimer's Disease

Alzheimer's disease is plaguing the world and is currently the most common cause of dementia. Characterized by the rapid progression of amyloid plaque buildup and tangled bundles of fibers causing cell death, Alzheimer's disease affects a person's memory, thinking and behavior. As the disease spreads out across the brain, various functions of the brain are lost. The brain death continues until complications lead to death. In this study, we will analyse risk factors for Alzheimer's. There are three primary hypotheses including that females will have a higher age-adjusted mortality rate (AAMR) than males, those living in poverty will have a higher AAMR, and finally white individuals will have a higher AAMR than black individuals. To analyze these hypotheses, we used data from the CDC WONDER Online Database and tested the hypothesis using statistical tests. Overall it was found that white individuals have a higher AAMR than black individuals, those who live in poverty have a higher AAMR than those who do not, and finally females have a higher AAMR than males.

Sami Noisey

Northeastern State University

Is It Ethical for the Homeless to Have Pets?

Abstract

There were several benefits to having companion animals. Research shows having a pet provides friendship and responsibility and contributes to positive emotional wellbeing (Slatter, Lloyd, & King, 2012). The study will access the following research questions: R1: Is it unethical for homeless to own pets? R2: Should homeless pet owners be responsible for care (food, shelter, health needs) of their pets? R3: Should the community adopt low-cost or free pet care programs to help with the costs of pet ownership by homeless persons? H1: It is ethical for homeless to own pets. H2: Homeless persons should not be responsible for their pet's food, shelter, and health needs. H3: Communities will take the responsibility of adopting programs for homeless person's pets needs and concerns. This study is a public opinion survey with three Likert-items (one a 1-4 scale, strongly agree to strongly disagree, with no neutral response). The current schedule of subjects indicates the use of descriptive statistics to decide the frequency of responses, and provide a measure of central tendency and measure of spread. Preliminary findings from 113 participants (mean age 41.5 years) indicate 87.6 % of participants agree that homeless persons should own pets, with 39.8 % of participants agree and 38.1% strongly agree that low-cost of free pet care programs should be in place for homeless pet owners.

Trevor Torgerson, Michael Bibens

Oklahoma State University

Celebrity Influence on Public Interest in Basal Cell Carcinoma

Introduction

Basal cell carcinoma (BCC) is the most prevalent form of skin cancer. Major risk factors include sun exposure and sunburns. Thus, most cases are preventable. Increasing awareness of this disease could lower incidence rates. The primary objective was to evaluate relative internet search interest in basal cell carcinoma following events such as awareness campaigns and celebrity diagnoses.

Methods

We used Google Trends to assess public interest in BCC over time points such as celebrity public media posts, Skin Cancer Awareness Month (SCAM), and summer months between January 1, 2013 and June 8, 2018. We also performed a Google Trends analysis of Melanoma under the same search parameters for comparison.

Results

We identified social media posts about BCC from celebrities, specifically Hugh Jackman, were associated with increased internet search interest. Furthermore, while internet search interest in melanoma coincided with Skin Cancer Awareness Month, a similar effect was not observed for BCC.

Conclusion

Celebrities appear to play role in increasing awareness and interest in BCC, whereas SCAM did not produce the same effect. As a result, the Skin Cancer Foundation and dermatology community should know that awareness campaigns for BCC may be less effective. Having a celebrity spokesperson for such a campaign has the potential in increase awareness in this area. Because BCC is largely preventable, increasing awareness could lead to a decrease in incidence.

Yu-Ling Chen

Southwestern Oklahoma State University

A Review of the Piano-Playing-Based-Training Programs in Hand Rehabilitation

Piano playing requires controlled fine motor movement. Several studies have applied piano playing for patients in hand rehabilitation for its potential to elicit experience-dependent neuroplasticity after stroke or brain injury. Playing the piano also provides auditory feedback to the movement, so patients automatically know whether they have correctly completed the movement or not, and it's also rewarding. Furthermore, the pleasure of music making motivates the patients to accomplish the demand associated with the repetition of motor tasks.

The purpose of this present study is to review the various piano-playing-based-training programs in the rehabilitation literature, specifically those which promote grip strength and finger dexterity in various populations. This study examines multiple factors including the protocols, length, and frequency of the sessions, the assessment tools, and outcomes. The results of this review reveal that most of the programs involved sequence of independent finger movement of varying levels of difficulty. Participants enjoyed the exercise in the sessions and at home, and their fine motor function improved. This review supports the use of piano playing in hand rehabilitation.

Education and Professional Studies.Nursing.01

Lauren Miller, Nancy Wilder-Pierce

Northwestern State University

Patient Portal Use in Diabetes Management

This project focuses on the use of patient portals and improvement of blood glucose levels in patient's diagnosed with diabetes in primary care clinics. Patient portal is an online-based tool, which allows the patient various points of access to their medical records including the patients list of medications with instruction on dosage, lab values that were ordered for the patient, and dates of upcoming appointments. Portals also allow communication between provider and patient, which extends education opportunities. Each portal comes with an email for the patient to ask questions that they may have, and it also allows the provider to communicate with the patient on any changes in the patient, the patient's appointment times, and even blood glucose levels that were drawn at the clinic. Portals are largely driven by financial for providers as part of federal US healthcare reform. Additionally, portals strive to improve consumers overall health. Results indicate use of patient portal is associated with better diabetes self-management. Patient with the motivation, knowledge, skills, and confidence to become actively involved in their healthcare have better health related outcomes. Patients who are non-users of portals had consistently higher blood glucose values when compared to patients who participated in portals.

Education and Professional Studies.Nursing.02

Madison Pittman, Teresa McDowell

Northwestern State University

Chest Pain Assessment Tool

Education and Professional Studies.Nursing.03

Rylee Spencer, Savannah Hill, Penny Bice

Northwestern State University

Pitocin For Laboring Mothers

Education and Professional Studies.Nursing.04

Shalyn Farrington, Kylee Loustaunau

Northwestern State University

Bedside is Best

The purpose of this project was to find the most effective way for nurses to give shift handoff so that patient safety will be improved. In the field of nursing, patient care and communication are the top priorities, yet there is no implemented standardized shift handoff protocol used in healthcare facilities or taught in nursing education. This project focused on answering the question: In patients admitted to the hospital, does desk report or bedside report with the use of SBAR decrease incidents at shift change and improve patient safety during a hospital stay? Research on this subject determined that the use of bedside report in conjunction with SBAR promoted patient safety, reduced cost to healthcare facilities, and increased both nurse accountability and critical thinking. The analysis of this data supports that in the field of nursing the implementation of bed side shift report and SBAR can greatly improve patient care and promote safety.

Education and Professional Studies.Nursing.05

Cheney Bird, TEIRNA ADAIR

Northwestern State University

No Nits, Ands, or Buts

The research project examines current recommendations for pediculosis management in school age children. Current management in many school systems is a No-Nit Policy. Each year, 12 million to 24 million days of school are missed by students suffering from lice. There is much stigma surrounding head lice infestation in the United States. Financial burden surrounding pediculosis eradication is unnecessary when considering the most current evidence based research. This research has been conducted to dispel the myths surrounding head lice in schools.

Education and Professional Studies.Nursing.06

Jessica Weidner, Mallory Stubbs, Sandra Colby

Northwestern State University

Stress and Coping in Nursing

Abstract

A strong relationship exists in the nursing profession between the effects of stress on a nurse's health and their job satisfaction. Consequences of chronic stress shows it can have a debilitating effect on an individual's health both physically and psychologically resulting in decreased work performance, absenteeism, and job turnover. Empirical evidence regarding stress reduction interventions suggests numerous positive benefits including increased functional capacity and quality of care, staff retention, and overall improvement in health and well-being. This research illustrates the effectiveness of healthy interventions on nurses experiencing occupational stress and burnout.

Sharon (Suzy) Klinger

Northwestern State University

Sepsis

Abstract

Sepsis is a complex syndrome with a wide spectrum of severity, is a common cause of death worldwide, and has easily treatable but has masked symptoms. These symptoms include decreased urination, changes in mental status, low platelets (blood clotting factors), breathing problems, abnormal heart functions, chills due to low body temperature or fever, and weakness. “Sepsis Six” resuscitation bundle of care, initiated in 2004, was used to raise awareness among hospital staff and improve the management of patients with sepsis. Bundles are groups of therapies built around the best evidence-based guidelines, which, when implemented together, produce greater benefit in terms of outcome than the individual therapeutic interventions. Upon presentation in the Emergency Room, six specific areas of sepsis care are outlined: intravenous fluids, blood cultures, antibiotics (after the blood cultures are drawn), a lactate level, oxygen, and urine output. The target population is ages 45-64 year-old patients presenting to the Emergency Room. Compliance with a bundle implies achieving all the specified goals in that bundle. The research of our study found that patients who receive the entire bundle had a crude mortality of 11.1%, which is 18.2% lower than those who received only some or none of the bundle components.

Education and Professional Studies.Nursing.08

Amber Gooch-Buchanan, Brian Moran

Northwestern State University

EtCO₂ With COPD

The use of ETCO₂ as the seventh vital sign has been a big discussion in the past few years as noninvasive monitoring has developed. Ponca City Hospital recently purchased vital sign equipment that has the capability of determining ETCO₂ non-invasively. This new availability has raised the question of the importance of its use. This literature review aims to determine a difference in capnometry values of hospitalities COPD patients compared to the general population. Results of this study were deemed inconclusive with parameters of COPD patients falling in the same set general population norms. Recommendations include the further studies of waveforms (capnography) rather than the numerical values of (capnometry) in the prediction of COPD exacerbation.

Education and Professional Studies.Nursing.09

Baleigh Watson, Kelsey Short

Northwestern State University

Activity Vs. Rest Post-Concussion

Our goal for this project included finding the best available research discussing treatments for concussions in college-age athletes. One source indicated that the rate of concussions reported has increased markedly in the last 15 years. Interest from the Northwestern Oklahoma State University Athletic Division on the topic, raised our suspicion on what options were available for those affected by the injury. Much of the available research was controversial and led to different beliefs on the topic. Combining the information led us to the conclusion that returning to work or school as soon as possible and adapting responsibilities that could decrease exacerbating factors, would allow the patients to return to normal functioning and increase protective factors. Involving the physician can rule out more serious injuries, including fracture and hemorrhage and increase the efficiency of interventions. As nurses we should be implementing patient teaching about the importance of reporting symptoms early on and the benefits of maintaining a follow up schedule.

Tilly Braddock

Northwestern State University

Anticoagulation Monitoring

The purpose of our project is to evaluate the difference in INR blood level results accuracy, cost of testing, and improvement in the patient's quality of life when using portable capillary CoaguChek INR testing compared to standard laboratory method. INR stands for International Normalized Ratio and is a standardized method for reporting blood coagulation with warfarin. When starting warfarin therapy, INR testing should be done 2-3 times per week (typically performed in a lab). Careful monitoring of patients on an anticoagulant therapy is important; under-anticoagulation increases the risk of stroke, while over-anticoagulation increases the risk of hemorrhage. There are two methods of testing the PT/INR values. The first method is portable capillary CoaguChek test. The CoaguChek is a portable device for testing International Normalized Ratio. The second method is laboratory blood draw testing in the Clinic or Hospital. Multiple studies involving over 300 patients on anticoagulation therapy have been performed with similar results. These studies concluded that there was a strong positive linear relationship between the test results, although there was found to be an overestimation of approximately 0.3 INR units with the portable CoaguChek. Traditional Lab INR testing is still considered the gold standard, but the portable CoaguChek monitor is suitable for use in the clinical setting. CoaguChek monitors offer a cost effective, less stressful testing option for patients

Kathlynn Smith

University of Central Oklahoma

Many Hands Make Light Work: The History and Development of an At-Large Sigma Chapter

Sigma chapters are often “stand-alone” and associated with only one academic institution resulting in limited resources. In Oklahoma in 1982, charter members developed an at-Large chapter composed of three academic institutions, OBU, UCO, and OU resulting in the Beta Delta-at-Large Chapter. Now, the chapter represents a total of five academic institutions including OCU and SWOSU. Membership has grown with over 6,000 members being inducted and currently has 673 active members representing these five schools. With that added membership, both benefits and challenges have resulted. Benefits result in increased resources which include money, room space, and varied membership background. Challenges include communication, meeting individual needs, and scheduling conflicts.

Finances from these chapters have allowed for increased allocation of scholarships, grant awards, support of other initiatives, and general meeting expenses. Scholarships have been a focus for the chapter since chapter inception. Scholarships given are estimated to be over \$80,000 for the last ten years to both undergraduate students and graduate members. In addition, \$2,000 has been offered annually in research grant awards. Besides supporting scholarships and research grant awards, the chapter has been able to support other successful initiatives.

Being an at-Large chapter exemplifies the phrase, Many Hands Make Light Work.

Kamaree Hatfield, Sumji Sherpa

Northwestern State University

Massive Transfusion Protocol with TXA

Reducing mortality is vitally important considering that trauma injuries are the number one cause of death among Americans aged 1-46 years. Massive transfusion protocols (MTPs) grant physicians the ability to follow an algorithm during a massive hemorrhage which allows for rapid replacement of blood products. MTPs are implemented to provide consistent treatment during hemorrhage. Tranexamic acid (TXA) a hemostatic agent has been shown to decrease mortality rates in trauma patients. In addition to decreasing mortality, tranexamic acid is also a cost-effective intervention. The most recent estimated cost of 1 unit of red blood cells is \$210.74, and the charge to the patient receiving the transfusion is \$343.63. In comparison, 1 gram of TXA supplied in a 10 mL vial is estimated to cost between \$45 and \$55. Some potential side effects and adverse reactions of TXA include nausea, vomiting, and diarrhea. Contraindications include acquired defective color vision, hypersensitivity to TXA, and active intravascular clotting. A systematic review found that when tranexamic acid is administered within three hours of injury it reduces the risk of death by 10% and the risk of death due to bleeding by 15%. Researchers in the MATTERS study concluded that risk for thrombotic events related to TXA such as deep vein thrombosis and pulmonary thromboembolism were too small to assess.

Education and Professional Studies.Nursing.13

Lisa Boye

Southwestern Oklahoma State University

"Are Leftovers Really Leftovers"

Abstract:

It is well recognized that we as humans tend to be greedy consciously and unconsciously, for it is in the nature of us all to do so. We have all come to the realization that we tend to have so much to eat often, and we end up reaching a marginal point, and those food ends up in the garbage. We don't have to; those leftovers can have a "second life". According to Stanford Magazine, 21.5 million tons of food waste are generated annually in the United States. Food waste cannot be stopped, but it can be used to produce more food. Giving leftovers a second life without putting them in landfills we can control the amount of methane gas in our atmosphere. In my poster presentation, I, Lisa Boye, an international student from Liberia, hope to rise an awareness on how to recycle leftovers, and why leftovers deserve a "second life" instead of landfills.

Education and Professional Studies.Professional Teacher Education.01

Karen Williams

East Central University

Analysis of Peer Review in Junior Physics Lab

Peer review was implemented in Junior Physics Lab the last two semesters the course was offered. The students used the rubric that was used to grade their formal lab reports to grade each other's reports before turning the reports in for grading by the professor. The effectiveness of peer review on their scores will be examined. The class scores will be compared with non-peer review classes.

Education and Professional Studies.Professional Teacher Education.02

Celise Curry, Jill Davis

University of Central Oklahoma

Family Math Game Night: Student-Faculty Collaboration for Transformative Learning in Teacher Education

This presentation describes a transformative service learning project in which an Elementary Education major collaborated with two teacher education faculty members to plan and implement a Family Math Game Night at a local elementary school. The project will be shared through a photo essay that is framed around the five interdependent stages of service learning: investigation, preparation, action, reflection, and documentation (Lake & Jones, 2012). The perspectives of teacher educators, education students, school representatives, and families will be shared.

Charles Ajjarapu

Cameron University

Photojournalism Ethic Issues

The picture I show above is one of a young man, probably somewhere between the age of fifteen and seventeen, based on assumption. The reason this photo raises so many ethical issues is because this is a gut-turning moment for anyone, including the family. At some point, journalist are expected to show more compassion and privacy towards that aspect of it. This raises another issue because these pictures will get eaten up by people; people are suckers for this type of content, and it brings so much emotional contraction to the person viewing it. It sends a powerful message to the audience, and brings so much more pathos, or emotional credibility to the author.

The general consensus of coverage of tragedy and grief is that it should be used under the circumstance that the family of the picture taken is okay with it being published and shown to people. There is a line that I believe should be drawn in the sand in which is a good time to use such photos. It portrays an emotional concept that grabs the reader to feel for them, and make them want to jump through a photo and give the person a long, comforting hug;, said by one of my classmates. That's why people use these photos and that is a good reason; we are journalist trying to convey a story. In conclusion, coverage of this matter should always be given permission, regardless of how impactful it could be. A human's feelings is far more important then trying to convey a message.

Fine Arts and Design.Art.01

Cierra Vaughn

University of Central Oklahoma

The Cultural Significance of Masks in 17th Century Venice, Italy, and 18th Century Chokwe Society, Angola

Masks are objects that have been used for centuries for different reasons throughout various cultures. While hiding the face of the wearer is a universal act of the masking, the meaning behind it can vary from spiritual, deceitful, honorable, and even rebellious. This paper examines the cultural significance of two such masks, the Bauta mask from 17th century Venice, Italy and the Pwo mask from the Chokwe people of 18th century Angola. First, this paper will briefly discuss the history of masquerades within these two cultures. Second, a formal analysis of the two masks will be made as a gateway into the remainder of the essay. Third, a comparison of the significance of the masks to their respective cultures will be discussed. In Venice, the masks are used to allow Venetians to commit immoral acts such as gambling and seduction. The Chokwe people use their masks for various ceremonies, such as rites of aging or celebrations. The information will ultimately indicate that while the masks served to stabilize social disorder within both societies, the cultural meaning placed within the masks differ from within a society with a crumbling hierarchy and a society that respects and honors their people and ancestors.

Fine Arts and Design.Art.02

Laurie Kinney

University of Central Oklahoma

Hashtag Activism: Examining Visual Artists Through the Lens of #MeToo

Throughout the years many women, and some men, have come forward to share their accounts of sexual abuse. Although these stories may have been acknowledged, they were often met with disbelief and varying amounts victim-blaming for those who spoke out. Two years ago, the #MeToo movement brought the realities of sexual assault in the entertainment industry to the forefront of the American zeitgeist. This movement quickly spread around the world exposing sexual abusers in a variety of industries and walks-of-life. In this paper I will discuss the presence of sexual assault in the Visual Arts, the reaction from those both in the art world as well as from the general public and the ongoing changes in art that are occurring as a result of the #MeToo movement. I will also pose the question; how can the art world best resolve the problems which have resulted from the indiscretions of a few of artists? This research is significant as it re-examines the works of three great artists through the lens of sexual misconduct and how the art world must reconcile these artists's works with their improprieties.

Fine Arts and Design.Art.03

Laurie Kinney

University of Central Oklahoma

Female Empowerment: Representation of the Kingdom of Women Through the Works of Qiu Ying

Art is often a lens through which we view the past. There have been numerous works throughout history depicting women in matronly or subservient roles, yet few have showcased women as strong sovereign figures. Surprisingly, a significant example of female empowerment can be found in the scrolls of Qiu Ying, a prolific artist from the Ming dynasty. In one of his seminal works, *Tribute Bearers*, he illustrates various kingdoms honoring the emperor of China during the Tang dynasty. Among the ten groups represented is the little-known Kingdom of Women from Northern Thailand. This research examines Qiu Ying's representation of female leaders in *Tribute Bearers* as juxtaposed to his depiction of concubines in another of his well-known works, *Spring Morning in the Han Palace*. I explore the differences in Ying's portrayal of women from the Kingdom of Women as compared to the archetypical female during the Ming dynasty. This research is significant as it shines a spotlight on the autonomous society of the Kingdom of Women. While there has been more exposure on matriarchal societies in recent years, Qiu Ying's painting may be the first artistic representation of this unique female-led civilization.

Fine Arts and Design.Art.04

Warapat Krasaetanont

University of Central Oklahoma

Yakas Mbaala Masks During and After the Colonization of the Belgians

In the sixteenth century, an African ethnic group known as Yaka migrated from Angola to Congo Free State which was colonized by the Belgians in 1908. After the decolonization in 1960, the Yaka became part of the southwestern Democratic Republic of the Congo. This paper examines the cultural dynamic significance of Yaka's mbaala masks used in the initiation ceremony during colonial and contemporary periods. During the colonial period, Yaka's mbaala mask has closed eyes signifying the continuation of Yaka's history as a form of resistance to the Belgian colonial power. Yaka people began to make mbaala mask with opened eyes after the decolonization to symbolize consciousness. This research broadens the scholarship on fluidity of African art as an oppose to the perception of an unchanged and fixed meanings of African's visual art.

Fine Arts and Design.Art.05

Michael MayMay

University of Central Oklahoma

Underglaze testing in Soda and Reduction Kiln

The purpose of this research projects is to examine how Amaco underglazes react in a high fired kiln. The study was conducted by firing 58 Amaco underglazes colors on ceramic test tiles at cone 10 in two types of kilns. A soda kiln and a reduction kiln were used to conduct the experiment. Each underglaze color had eight ceramic test tiles that were divided between two kilns with 2 tiles having just underglaze, and 2 tiles with underglaze and clear coat. The research shows that the Amaco colors react best in the reduction kiln with a clear coat glaze on top. Most of the colors in the soda kiln with and without the clear glaze became muddy and darkened.

Fine Arts and Design.Design.01

Sam Ladwig

University of Central Oklahoma

Update Required: New Software, New Syllabus

As UX tools continue to become more powerful, the formerly distinct roles of visual designer, information designer, interaction designer, and marketing strategist have been conflated into a single discipline with software packages that can help you "do it all." However, efficiency doesn't necessarily increase efficacy. In this environment not only is the designer's focus spread across all of these distinct disciplines, but the specific tools, standards, point of view, and emphasis have more to do with the designer's training than the task at hand. This is compounded by the continuing battle between various software companies to become THE industry standard. Whether a tool is intended to facilitate the design process, evaluating the output of that process, producing content, or all of the above impacts the definition of "user experience" and the approach to UX design. Choosing a particular tool necessarily affects the approach.

This presentation will show student work that highlights the relationship between curriculum design, the ubiquity of Adobe Creative Suite, other major players, and the ever-changing landscape of contemporary design and the tools that define it.

Fine Arts and Design.Design.02

Amanda Horton

University of Central Oklahoma

How My Flipped Classroom Flopped: A case study in teaching design history

In recent years there has been a trend in education towards the Flipped Classroom model, taking traditional instruction out of the classroom and making class time instead focus on discussion and course work. This type of instruction seems ideal and after thoughtful consideration a plan was adopted for History of Graphic Design I, and it failed miserably. This paper will examine what went wrong with the adaptation of the flipped classroom and address questions like: What went wrong? Will flipped classrooms on design history always fail? And, how to pick up the pieces when your flipped classroom flops. When my flipped classroom failed it pushed me to reassess the curriculum, our design program, and re-evaluate the goals of the class, as a result I gained a lot of insight into my strengths as an instructor; intent is to provide a case study that other design educators can learn from. Failure is often taught as a learning opportunity for our students, and as educators it is important to keep in mind that we can learn from them as well.

Fine Arts and Design.Design.03

Seon MiChoi

University of Central Oklahoma

Case Studies of 3D-Printed AMIE 1.0 And NYC Urban Post-Disaster Housing

The large-scale natural disasters destroyed houses and have displaced disaster victims for much longer periods. The victims needed to move from the shelter to temporary housing, however, this has been uninhabitable or unsuitable for urban environments. FEMA's trailers have provided had negative impacts on human health due to high concentrations of indoor VOCs. The currently used disaster housing required a large land area, but through the lesson from Hurricane Sandy, individual single-story housing was impractical in the limited space of urban environments.

The researchers conducted case studies to analyze habitability features of disaster temporary housing models: First, the ready-made modular stackable post-disaster housing developed by New York City's Office of Emergency Management and Department of Design and Construction works in urban areas. This multi-story and multi-family temporary housing structure is made from recyclable materials, and the ventilation system is energy efficient. All units are ADA compliant for special needs; Second, U.S. Department of Energy's Oak Ridge National Laboratory has developed a 3D-printed house, AMIE 1.0. This is printed in pieces, then assembled to produce the tube-shape housing. The building powers its lights and appliances with rooftop solar panels. Consideration of habitability as well as innovative approaches are expected as essential factors in developing appropriate types and functions of disaster temporary housi

Fine Arts and Design.Multimedia Design.01

Connor Albrightson

Southwestern Oklahoma State University

Graphic Design for Washita Battlefield National Historic Site

The purpose of this project is to showcase some of the artwork and graphics made for the Washita Battlefield National Historic Site, in Cheyenne, Oklahoma. Students from Southwestern Oklahoma State University were hired by Dr. Siriporn Peters to assist in the making of a 30 minute documentary over The Washita Attack. When the film is completed, it will be showcased for education purposes to people who visit info center. In the meantime at this fair, we want to talk about the process of making this film. It will be a poster that goes over artwork based off a Cheyenne artist, the making of motion graphics and sets, and how the computer programs were utilized to make assets.

Fine Arts and Design.Music.01

Tessremy-Schumacher

University of Central Oklahoma

CD: MUSIC FOR PEACE III

The Outreach and CD project "Music for Peace III" completes the "Music for Peace" Trilogy. The initial CD "Music for Peace I" was inspired by "Remember Me" by David Maslanka, a composition I premiered in 2013 with Dr. Brian Lamb and the UCO Wind Symphony. The beauty of this score was overwhelming. Only later did I learn about the horrific scene described in his program notes. While struggling with this contrast I understood the music's healing effects on the human soul, in Maslanka's words: "Musical Vibration heals". Shortly after the premiere I felt the mission to bring this concerto to more people, young students in particular, and my public schools concert initiative "Music for Peace I" was born. The public school students wrote touching testimonies about their thoughts and emotions while listening to this concerto. The Outreach and CD project "Music for Peace II" focused on bridging different cultures and religious beliefs. "Music for Peace III" addresses the strong need to create opportunities for creativity and self-expression for teenagers and young adolescents. This project seeks to inspire students to explore their own creativity and channel their emotions into creative projects. A carefully selected vocal program with instrumental accompaniment including compositions by UCO students was recorded and released on CD with Xolo, Germany and digital sites.

Fine Arts and Design.Music.02

Alexandria Carmon

University of Central Oklahoma

Evaluating and Analyzing Children's Perception of Opera to Enhance Educational Outreach Methods for Painted Sky Opera

This research is designed to evaluate existing methods for presenting opera to elementary aged children in Oklahoma City and the surrounding areas. The project will add preliminary and follow-up surveys to already existing educational outreach programs provided by Painted Sky Opera. With state budget cuts, the funding for arts have been drastically depleted and there are becoming less opportunity for children to experience art in a visceral way, especially opera. This study will evaluate the effectiveness of the company's current program and identify areas that are achieving the goals of their mission and areas that can be improved.

Fine Arts and Design.Music.03

Danielle Herrington

University of Central Oklahoma

“Strangers with the Same Last Name: Thematic Transformations in Jake Heggie’s Chamber Opera *Three Decembers*”

Jake Heggie is recognized as a significant American opera composer, garnering fame through *Dead Man Walking* (2000), yet no scholarly research exists addressing his lesser known operatic output. Therefore, I shed light on Heggie’s chamber opera *Three Decembers* (2008) that demonstrates his mastery of musical motives. This study investigates Heggie’s creative process and compositional techniques through theoretical analysis, substantiated by the composer himself, which explores the plethora of themes inspired by the opera’s three characters and relatable realities. My findings reveal twelve musical themes that permeate the score. Heggie navigates conventional tonal territory while infusing it with illustrative colors and heavy doses of dissonance through an economy of means. Motivated by each character’s given disposition, themes organically emerge and are then transformed when re-iterated to illustrate emotional shifts. Furthermore, I contend that Heggie’s compositional process of utilizing character-driven themes cultivates a connection with today’s modern audience and successfully communicates universal topics. Heggie probes the questions surrounding the innate dysfunction of the family unit as it evolves and children become adults. Through musical means, the opera centers on the familial condition of becoming strangers with the same last name. This presentation tracks selected examples, assessing psychological derivations a

Fine Arts and Design.Music.04

Eric Sorensen

Southwestern Oklahoma State University

Uneven Playing Field? A Study of Female Representation in Professional Brass Playing

This research project will look at the frequency of professional female brass (trumpet, horn, trombone, tuba) players compared to other sections of orchestras. Prior to conducting the research, my null hypothesis is that there should not be a significant difference in number of female vs. male brass instrumentalists except for the French Horn section. I will collect data on orchestra rosters from the websites of the top 20 symphony orchestras in Gramophone Magazine's 2008 poll of music critics and analyze any significant difference in the gender of personnel from a psychological, cultural, and physiological perspective.

Fine Arts and Design.Music.05

Hayden Stephenson

Southwestern Oklahoma State University

Telemann: The Early Pedagogue

The Baroque Era (1600-1750) was a musical period of great extravagance. In addition to the creation of several new genres and instruments, the Baroque Period also ushered in the time of the amateur musician. As music became more accessible to the public, people began to learn to play music and perform small pieces in their homes for entertainment. The rise of music for home performance led to the rise of pedagogical publications. This research project explores historical publications and the pedagogical writings of Telemann as a guide to creating my own historically informed ornamentation.

Georg Philipp Telemann (1681-1767) was a prominent Baroque composer. As amateur music grew in popularity, composers like Telemann began to publish music specifically written for beginners. This presentation explores Telemann's role as an early pedagogue as demonstrated by his publications *Der Getreue Music-Meister* and the *Methodical Sonatas*.

One of Telemann's lesser known pedagogical writings are two sets of sonatas titled the *Methodical Sonatas* published in 1728 and 1732. The unusual part of this composition is that Telemann published a second line that includes the melody and his own ornamentation. The *Methodical Sonatas* are important because they provide direct insight into how Telemann would have ornamented his own music which allows present day performers to create historically accurate ornamentation.

Fine Arts and Design.Music.06

Jana Foster, ChihChen Lee

Southwestern Oklahoma State University

Remembering The Way We Were: Using Active and Passive Listening Therapy to Retain Memory

It is a well-known and well-studied fact that memories are often triggered by music that has been associated with life events. The music of our life is personal to each person, and in adults with dementia or memory loss, music can serve as a catalyst to memory retrieval. The objectives of this proposed research are to: 1) summarize how music forms associations with our memories of life events, and how/where the memories of both long-term or short-term associations are assembled and stored in the brain and 2) investigate whether memory recall is more effective with passive/receptive or active music therapy. My hypothesis is that although active music therapy may be more effective than passive/receptive music therapy, either therapy contains only the hope of extending memory for a longer time before it is lost in the disease of dementia when comparing with the memory declines of ones without receiving any music therapy. I will review peer-reviewed journal articles and published literatures to support the arguments in examining the proposed hypothesis, and suggest further studies to advance in this research.

Fine Arts and Design.Music.07

Breck McGough

University of Central Oklahoma

To Awaken the Sun: Composing New Music for Historical Instruments

In 2018, the University of Central Oklahoma's Brisch Center for Historical Research received a grant to create a concert tour with the purpose of introducing elementary school students in Oklahoma to Baroque-era instruments and performance practice. A captivating story was written for which music would accompany, and a cast of instrumentalists was selected to perform. All that was needed was the original music. However, this would be no ordinary composition. The story called for modern instruments and historical instruments to play in concert. One major obstacle in accomplishing this task is that most modern instrumentation and orchestration texts do not include information on Baroque-era instruments. The other challenge is that the tuning of historical instruments and modern instruments is quite different. Research was performed under the instruction of Dr. Tess Remy-Schumacher, an expert in Baroque performance practice. Historical music methods provided by the Ted Honea Collection for Music Research and the individual input from musicians who specialize in historical performance yielded the answers to these compositional riddles. The result is a completely new musical work written for very old instruments.

Arianna Martin

Southwestern Oklahoma State University

Lavender Country: The Counter-Cultural Album That Pioneered Queer Country Music

In 1973, Washington native Patrick Haggerty assembled a band and produced a record titled *Lavender Country*. It is widely considered the first openly gay country album, and its 1,000 copies were sold in secret through ads in underground queer magazines. Haggerty and his group toured and performed a few more times, but soon disbanded, and the record became an obscurity until it was rediscovered in the early 2000s. Haggerty's album adds invaluable context to a genre steeped in tradition. His lyrics demonstrate a wide and forthright rejection of establishments such as the masculine/feminine dichotomy, conversion therapy, and the need to pass as heterosexual, but simultaneously, his music embraces the symbolism that nature lends in storytelling, the sincere and sorrowful soul of a lover's lament, and even the power of the blues to tell a grim tale. Lyric analysis, interviews, and a comparison to the societal norms established by the genre reveal that *Lavender Country* utilizes the instrumentation, form, harmonic/melodic practices, and storytelling tropes of its contemporaries, yet it defies almost every value and teaching embraced by the conservative culture of country music, a genre that caters to its audience, celebrating heteronormative and patriarchal gender roles, images of home and of life as a laborer, and God-and-Country patriotism.

Fine Arts and Design.Music.09

Alexander Davis

Southwestern Oklahoma State University

From Signaling to Ceremony

Since man's earliest struggles against himself to his most recent triumphs over the gods, the trumpet has enjoyed an illustrious existence as an essential tool in military organizations. Its boisterous calls inspire men to charge headlong into battle, fighting with reckless abandon and vicious ferocity; the robust, yet piercing tone striking fear into the hearts of their enemies. Brilliant fanfares march impressive formations of fighting men passed the reviewing stand to be inspected by the commanding general, his staff officers, and reverent spectators. Somber, yet pure sonorities accompany the mournful cries of those left behind as the dearly departed are laid to rest in the field of honor. From the battlefield to the parade field to the cemetery the trumpet has known many names over the centuries and has been fashioned out of numerous materials. Although accounts of its use to organize and motivate soldiers during the heat of battle spans millennia, its purpose in today's militaries is more ceremonial than tactical. This presentation aims to examine the advancements in the technology that lead to a tactical shift in the way modern wars are fought and relegated the trumpet to a more ceremonial role away from the battlefield.

Liberal Arts.Communication.01

Alexis Loudermilk

University of Central Oklahoma

Peer mentor program: Benefits of implementation

Peer mentor programs increase participants' academic success, campus involvement, class engagement, and career outcomes compared to students who are not involved in peer mentor programs. Peer mentoring assists students transitioning into their major, graduate school, and the workforce; enhances participants' professional and personal skills; and contributes to increased retention rates.

Liberal Arts.Communication.02

Mary Carver

University of Central Oklahoma

The Rhetorical Paradox of Anti-Suffrage Women

Women anti-suffragists largely have been overlooked in accounts of the woman's suffrage movement. However, the some 350,000 women who opposed their own enfranchisement faced a significant rhetorical dilemma. They believed strongly in the "woman's sphere" of purity, piety, submissiveness and domesticity; the world of politics should be left to men. As state after state began to enfranchise women, anti-suffragists felt the need to protect their world. However, in order to fight enfranchisement, anti-suffrage women had to enter the political arena. Antis became what they were fighting against, political women. This study examines how the anti-suffragists used the rhetoric of paradox and argumentative distinction to hold their movement together. *Anti-Suffrage Essays by Massachusetts Women* is used in this study to represent the various arguments put forth by the Antis. The book was published in 1916 by the Massachusetts Anti-Suffrage Association. It contains 17 essays from prominent speakers, writers and organizers of the 1915 Massachusetts anti-suffrage campaign. Research found that Antis managed their paradox in three ways: by recognizing the inconsistencies in their arguments, creating an extremist enemy, and justifying their actions on moral grounds. Although these strategies were successful at first, anti-suffragists ultimately failed. Though we cannot attribute the success of woman suffrage to the failure of the Antis, they did contribute to their own demise.

Liberal Arts.Communication.03

Jordan Broiles

University of Central Oklahoma

Moonlight: Sexual Abuse Against Black Males and the Effect on their Masculinity

This research explored the lived experiences of collegiate Black and multiracial (Black being one of the races) males who have been sexually abused in the past and the effect on their masculinity. In this study, sexual abuse is self-defined as a minimum of one unwanted sexual encounter by the force of the perpetrator. The context of masculinity is defined by Harper (2004), who conceptualized masculinity among Black male achievers on six predominantly white campuses. Participants in Harper's study defined masculinity within the structure of hegemonic gender norms, including dating and pursuing romantic (oftentimes sexual) relationships with women, any type of athletic activity (organized sports, individual exercise, and bodybuilding), competition through sports and video games, and accumulation and showing off of material possessions. In this mixed method study, Intersectionality and Critical Race Theories were used as theoretical frameworks within which to understand the relationship between past sexual abuse of Black male college students and their masculinity. Since there is limited empirical research that discusses sexually-abused Black or multiracial male multiracial college students, this study focused solely on providing insight about those experiences and how they relate to Black male masculinity.

Liberal Arts.Communication.04

Shannon McCraw, Ming-Shan Su

Southeastern Oklahoma State University

Exploring a university's official Twitter hashtag: Performing a sentiment and semantic network analysis.

This research is an exploration of how Southeastern's official Twitter hashtag has been used since its inception in 2013. Using Python's Tweepy module to retrace/scrape 765 tweets from Twitter's public API, and then using Python's Textblob module to perform sentiment analysis of the tweet content, we found 53% of the tweet contents are positive, 45% are neutral, and 2% are negative. We then performed a semantic network analysis of the tweet data using Leximancer, a text analytics tool. From this analysis, we assert the content may be categorized into three key areas: promotional, informational, and warning. The semantic network shows @GoSoutheastern (the university's sports Twitter handle) using #se1909 and #werolltovictory to promote university athletics. In addition, the semantic network shows #didyouknow associated with informational content highlighting current students and alumni. Finally, the semantic network shows a concentration of words associated with weather warnings.

Liberal Arts.Communication.05

Kaelee Trammell

Southwestern Oklahoma State University

Deaf to Depression: The Stigmas Society has Placed on Mental Illnesses

Statistics on depression/anxiety/bipolar disorders, the stigmatizations placed on them, etc.

Liberal Arts.Communication.06

Kristopher Mayfield

Cameron University

Dear White People: Intercultural Communication Between a Show and Its Audience

Abstract

This paper examines the Netflix original series, “Dear White People” through the lens of intercultural communication and applies the ten core concepts of Identity Negotiation Theory (INT) to its characters. Within the show, the interactions between the students of color and their white counterparts, as well as the battle against prejudiced institutional policies, produces a wide variety of observations critical to the study of intercultural communication. These demonstrate the way in which different aspects of each characters’ identity are constantly affirmed, reaffirmed, challenged, and otherwise negotiated. While the literature available in the area of Identity Negotiation Theory is broad, the application of this, or any other theory for that matter, to the show Dear White People is not present in academia. For that reason, this paper will be applying the theory utilizing academic sources from a variety of backgrounds. This literature is not simply confined to studies, but also resources in defining and identifying Identity Negotiation Theory in various settings. Through the application of these tenants to the characters and situations presented in the series, we see that the recollection of the characters’ narratives and experiences enriches the understanding of intercultural communication between the series and its audiences.

Liberal Arts.English.01

Jasmine Misner

University of Central Oklahoma

Caregiving and the Caring Place in Victorian London's West End

Space and place, viewed as socially constructed concepts, are imbued with meaning used to define particular locations and the spatial thinking of societies, as well as how society and social practices are regulated and disciplined. Analyzing the architecture of Victorian London's West End, this project will work towards understanding how space and place influence and affect health for the poor. This understanding will aid in the prediction of future caring places and is aimed at how the caregiving community influenced the culture and society of Victorian London from the New Poor Law of 1834 and how that translated into the National Health Care System seen there today.

Interdisciplinary research will be used to understand how the space and place of Victorian London's West End affected and influenced the care provided for the children of the poor, as well as the similarities and differences in care provided to the poor versus the rich. Using archival material found at the British Library such as manuscripts, minutes of evidence, and other such primary sources describing the living conditions, health services received by, and other social services provided to the poor will be used to investigate how these services were distributed, how the hospitals and other providers of services were funded, and who the organizations/groups that made these decisions were.

Liberal Arts.English.02

AsJa Cole

University of Central Oklahoma

Reading Hogan Aunt Moon Young Man; through a Postcolonial Feminist Lens: The Old Versus the New

Throughout history, Native American women have struggled to claim their place in a society shaped by colonization. Because of this, Native American women are not only marginalized by Western ideals and standards, but are ostracized within their own tribal communities as Western beliefs have influenced and continue to influence traditional ways of life. This influence creates tension as the once-valued, traditional beliefs held by Native Americans concerning gender roles clash with those imposed by colonization. This dichotomy leaves Native American women at a difficult crossroads: between choosing to remain true to their history only to face ostracism and ridicule, or choosing to allow Western ideals shape their identity while losing their history in the process. Linda Hogan's short story, "Aunt Moon's Young Man" illustrates the juxtaposition of traditional versus Western ideals. Hogan creates characters in her short story that exemplify the characteristics of both choices, and some characters who remain somewhere in the middle. In doing this, Hogan helps open space outside of the binary of traditional versus Western to create a definition of what it means to be a feminist for Native American women.

Liberal Arts.English.03

Kristi Celestine

Southwestern Oklahoma State University

Bigfoot Through the Ages: A Tale of Cultural Significance

The ultimate goal is not to try to prove that Bigfoot or bigfoot-like creatures exist. Instead, this project demonstrates the rhetorical significance of these creatures across cultures. The project will present evidence based on stories both from Native American tribes and from various other groups around the world, starting with modern media portrayals and following the evidence back through history. The goal is to implant the idea that these creatures, known mainly by their modern portrayal, have a basis in ancient ideas. There is a reason these stories have been handed down through many generations, but are they in danger of becoming irrelevant because of homogeneous media portrayals?

Liberal Arts.English.04

Ginger Johnson,

East Central University

Caught Between Two Allegiances: Examining Passing and Identity through Nella Larsen and Ernest Cline

Passing by Nella Larsen, set in the 1920s, and Ready Player One by Ernest Cline, set in the future year 2045, tell stories of African American women passing for white. They live in worlds where they can't share their true selves with anyone: Clare (Passing) lives in fear of her racist white husband discovering she is biracial, and Helen's mother (Ready Player One) makes her create a white male avatar in the virtual world OASIS.

This paper will examine these characters to draw out the distinctions between passing & people living differently from who they are because it is more advantageous or even safer to do so & identifying & taking on a persona and feeling more comfortable in it. Helen is only passing as a means of survival in her virtual world, while Claire is also surviving, but in some ways, has adopted her white life.

Passing takes place in a time when African American's were not considered equal to whites. Clare goes to live with the white side of her family and is exposed to the privileges that white Americans receive. This, along with her racist husband, make her trapped in this life. Helen, while in the future, deals with many of the struggles African Americans and women have today. Playing Halliday's game and her mother making it clear that white men have it easier, Helen had no choice but to adopt this life. Stories like these can lead to acceptance and help people who feel trapped like these characters.

Liberal Arts.English.05

Jessica Spence

Cameron University

Exploring Rhetorical Functions of Using Passive Voice in Communication

This research explores the significance and appropriate use of passive voice in communication. In academic writing, passive voice is often viewed as a “weaker form” of writing. However, passive voice has some useful rhetorical functions in communication. Often, writers tend to avoid passive voice because they do not understand when it is appropriate to use passive voice in communicating their message. Using research through internet sources, and university library databases, this study examined and analyzed how people, especially scholars, and professionals, use passive voice in different rhetorical situations to communicate their message effectively. This research found that passive voice has three major positive rhetorical functions: First, using passive voice can shift the focus of communication such as emphasize the outcome of the action. Second, in some situations passive voice is effective to use for certain professionals. Finally, in some situations the passive voice can makes communication more direct and concise.

Liberal Arts.English.06

Shun Kiang

University of Central Oklahoma

Reading the Anglophone Novel in the Age of Globalization

At its most basic, the Anglophone novel means any novel written in English; but over the years, the Anglophone novel has been studied as a specific genre of fiction: a transnational mode of literary production that addresses the histories of colonialism and ongoing realities of neocolonialism or neoliberalism. From the 1970s when Anglophone novels were read within the context of Commonwealth literature (literatures from the United Kingdom and its former colonies such as India, Africa, and the Caribbean), to the rise of postcolonial studies in the 1990s when Anglophone novels were collectively theorized as "Third-World" literature, an anti-colonial resistance at the margins writing against the literary traditions of the West, contextual and cultural diversity has made the field very difficult, if not impossible, to define with precision. My research, a special issue of *The Global South Journal*, will bring together 11 essays that examine persistent and new forces that shape our reading habits and interpretations of Anglophone novels. This research seeks to reinvigorate the need to study the Anglophone novel as a witnessing that documents the often-forgotten lived experiences of colonial violence, and to expose an ongoing struggle where only certain, highly selective marginal voices are included in the global literary market, where literary value and aesthetic judgement continue to reflect/reinforce Anglo-American tastes of and attitudes toward what's purportedly "global."

Liberal Arts.English.07

Breanna Lane

Cameron University

Into the Guide: Editing the Outdoor and Trail Guide to the Wichita Mountains A group of 10 students in an undergraduate editing course began work on a revision of the Outdoor and Trail Guide to the Wichita Mountains, a popular book used by hikers and nature enthusiasts for over 25 years. At the request of the Friends of the Wichitas, a 5013c organization, students performed tasks including editing for gender-neutral language, fact-checking the maps in the Guide as well as the veracity of some of the historical and native American lore contained therein, and general copy-editing. Working with the Friends organization, students made significant changes to the Guide, and developed a proposal for completing the project. Reardon (2016) suggests that service-learning projects such as the present example make the process of writing more public and more transparent and help students to better understand the tacit dimension of writing practice in a public service setting. The feedback provided by the Friends organization allowed students to understand audience and readership in ways that more traditional courses cannot provide. Plans for completion of the Guide, including a digital version, will be presented.

Liberal Arts.English.08

Katelen Cowger

East Central University

Tribals and Tribulations: Choctaw and Chinese Americans Fight Cultural Suppression and Identity Confusion Through Tradition

Mainstream American society has a history of suppressing minority voices and censoring ideas contradictory to the "American way." This means silencing indigenous voices, such as those in LeAnne Howe's *Shell Shaker*, and ones of Chinese Americans in Maxine Hong Kingston's *The Woman Warrior*. Although in different times and situations, the Chinese-Americans and Choctaw people similarly use culture to survive, defend, and fight off pressures of a society that demands conformity and assimilation. The consequences of these pressures are reflected by these authors and others like them in the identity of characters, through the influence of gender, the experience of "double consciousness," and the relationship between silence and suppression. In order to defend against these pressures, Chinese Americans and the Choctaw people use ancestral help, community, and most importantly, oral tradition. Storytelling in both communities is at the heart of culture, so it is the sole defense against a society trying to destroy them at their core and one in which both these works clearly demonstrate.

Liberal Arts.English.09

Socorra Rider

East Central University

The Representation of Native Americans and their Culture in Creative Writing

This presentation will emphasize the representations of Native America by showing original writing and original stories told and handed down by members of the Chickasaw Nation. Representation for any Native American tribe in the United States is few and far between. In this presentation, stories handed down from generation to generation will be shared in hopes to influence a further practice of Native American pedagogy.

In terms of Native American representation, stories and experiences are handed down in any Native American family/tribe. As time goes by, culture and representation in Native America dissipates. This piece reflex on a personal story, passed down by members of the family to help rekindle the fact that Native American practices are still in effect. This piece has instances of Medicine Men, practices with sage, rituals, good and bad medicine, and even Chickasaw seers;so not only are readers getting their own reading experience, they're getting their own experience in the Chickasaw culture.

Liberal Arts.English.10

Laura Blackstone

University of Central Oklahoma

The Owl and the Nightingale; A Poem of Manners

The purpose of the poem "The Owl and the Nightingale" has been debated for centuries. This analysis provides evidence of the poem being an allegorical book of manners. It demonstrates how women of the time period were not supposed to behave.

Liberal Arts.English.11

Laura Blackstone

University of Central Oklahoma

Dante's "Divine Comedy"

This analysis examines the connection between the topography and religious symbolism within the Comedy. The primary focus will be on "The Inferno";

Liberal Arts.English.12

Jaid Wehrenberg

University of Central Oklahoma

Traveling and Writing with Mary Shelley

My work on Mary Shelley's travels in Italy expands the current focus on her as merely the author of *Frankenstein*. Mary Shelley wrote two travel narratives, several novels, biographies, poems, and short stories during her life yet she is mostly known for her biographical notes on Percy Bysshe Shelley's poetry, her late husband, and *Frankenstein*, which some scholars have considered highly influenced and edited by P.B. Shelley. Modern scholarship focuses primarily on her contribution to the Romantic era and her literary parentage. During my research in London and subsequent travels throughout Italy, I discovered Mary Shelley's desire to become famous on her own rather than because of her husband's achievements. Her journal entries and letters to friends, as well as her travel narrative, show her desire to free herself from her dreary existence in England and become someone notable in her beloved Italy. My research unmask the typical portrayal of Mary Shelley, unveiling her life-long affection and wish to return to her Italy, where she lost her husband and children, but also where she found herself.

Liberal Arts.English.13

Min TzuenChiou

Southwestern Oklahoma State University

Music Therapy and BPSD

In my research, I am going to share my findings on how Music Therapy can help reduce emotional stress and anxiety among elderly who suffer from Behavior and Psychology Syndrome for Dementia.

Liberal Arts.English.14

Koal Kinder

Southwestern Oklahoma State University

How Electric, Hybrid, And Gas Cars Stack Up Against Each Other, And Which Is Right For You

In his poster presentation, Koal Kinder will unpack some interesting facts based on his compare and contrast study of electric cars, and how they stack up to regular gasoline cars and even hybrid cars. The presenter will also share his findings on whether electric cars are better or worse than hybrid or gasoline cars in terms of cost, maintenance, accessibility, and environmental health.

Liberal Arts.Ethnic Studies.01

Abbas Johari

Cameron University

Blocks to Critical Thinking

This presentation will provide some rich literature and findings concerning how to avoid errors (blocks) in the analysis of ethical and /or moral issues. It will explain dispositions and abilities of the critical thinker, in detail. The blocks include cultural conditioning, reliance on authority, hasty moral judgment, black-and-white thinking, labels, resistance to change, “mine-is-better,” double standards, unwarranted assumptions, over simplification, and frames of reference. The work has used a critical review as its research methodology to obtain its findings.

Liberal Arts.Geology.01

ArpanaJames, ShannonMarcar

Southwestern Oklahoma State University

Food Scarcity

We strongly feel that in the present world, resources are depleting and man is solely responsible for it. In our poster presentation, we are sharing our findings on how much food is being wasted everyday simply due to cosmetic values and standards.

We hope to reframe the idea of one man's trash could, after all, be another man's breakfast, lunch and dinner.

Liberal Arts.History.01

MichaelSpringer

University of Central Oklahoma

Student Research Using a Multi-Mentor Model:

UCO and the Dutch Church Book Provenance Project in London

Engaging students in research, one of the ten high-impact teaching practices described by George Kuh in his 2008 AAC&U report, is an effective way to help students engage actively with the material, learn the skills of the historical profession, and develop a sense of their professional self. Recent research on the structure of mentoring suggest the benefits of moving outside the mentor-protégé model, often used in History research, towards experiences where students work in teams with multiple mentors. In 2016, I worked with colleagues at Lambeth Palace Library and Archives and the Dutch Church in London to create a new student-centered research experience that created a research team experience for History majors. The undergraduate and graduate students join researchers and archivists to work on the Dutch Church Book Provenance Project, an effort to identify and research the historical collection given by the Dutch congregation to Lambeth Palace following World War II. The project introduces students to the history of the book, philanthropy in London, and the role of the Dutch community in the city's rich history. The poster will discuss their experience and the benefits of the multi-mentor model for history research.

THE LEGACY OF EMPEROR CONSTANTINE c. 272-337

Constantine ruled as Roman emperor from 306 to 337. Christians consider him the first Christian emperor in history, receiving the title of "the Great." Before his reign, Christianity faced persecution as a grass-roots movement, especially severe under preceding emperor Diocletian. In 313, Constantine's Edict of Milan permitted the toleration of Christianity, but he encouraged and promoted this increasingly influential movement as a unifying force within his vast state. He ordered church construction projects and conducted financial, military, political, and social reforms across the empire. He oversaw the First Council of Nicaea in 325 to resolve doctrinal disputes and formulate a standard Christian profession of faith (Nicene Creed). Constantine proved overall to be an effective ruler who briefly was able to bring about unity to the declining Roman Empire. Though converting only upon his deathbed, his reign contributed to the Christian faith's cultural flourishing in his empire. Roman Catholics and Eastern Orthodox Christians regard him and his mother, Helena, as saints. In particular, the Orthodox Church acknowledges him as the first East Roman (Byzantine) emperor, since he relocated the new imperial capital in 330 from Rome in Italy to Constantinople (City of Constantine) now in Turkey. Concerning his admittedly complex legacy, this period marked the beginning of state control in church affairs for many centuries.

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Liberal Arts.History.07

TimothyAtakora

Northwestern Oklahoma State University

Idealism vs Realism on immigration in the United States

This research considers the many different concepts of realism and idealism, particularly the matter of immigration to the United States. For a long time, immigration has been a pivotal issue in the American discourse. In today's society, it would be "ideal" for the immigrants to migrate into the United States to improve their lives. However, "realistically" it would cause issues such as wage disparity in the local population, challenges to the education system and healthcare systems, and stress on developing nations of immigrants. The number of immigrants arriving in the United States has generated new questions about how it can control the flow of immigration while not draining the human resources of the countries of origin. The solution will emanate from the people of the United States and how they view immigrant's effects on their way of life. The government will then have to establish policies and reforms to these understandings. The big question would be would immigrants be able to enjoy the benefits of native-born Americans.

Liberal Arts.History.08

BlakeJanak

University of Central Oklahoma

Homeward Bound: The Exile and Return of Ja Ja, Chief of Opobo

Between 1870 and 1887, Ja Ja, Chief of Opobo (1821-91) ruled with an iron fist in commercial affairs, in the wake of colonial dominance in West Africa. Asserting British interests before indigenous sovereignty, Consul Harry Hamilton Johnston (1858-1927) deported Ja Ja to the Windward Islands in 1887. Research concerning Ja Ja's final years remains nonexistent in academia. This project aims to identify, read, and process available manuscripts relating to Ja Ja's peculiar experience in captivity (1887-91).

Liberal Arts.History.09

BethAnderson

University of Central Oklahoma

Penny Dreadfuls and the Shaping of Juvenile Minds 1830-1890

In Britain, penny periodicals began to appear in the early 1830s appealing to entertain young working class men at the cheap price of one penny. These periodicals started off as tall tales and entertaining stories to pass around after a long day of work. They soon started to recount more adventurous and terrific narratives of ghouls, highwaymen and pirates. These stories served as inspiration for the contemporary modern horror stories and films. People began to call these affordable papers penny “awfuls”; penny “terribles” and a more familiar name, the penny dreadfuls. The message seemed harmless enough until murder at the hands of these young men became more frequent. Parliamentarians blamed these 'penny pockets of poison' for the rise in juvenile violence instead of taking a closer look into the cause for their seemingly sudden outburst of anger and rage resulting in the loss of human life. The critical MPs even claimed that these publications threatened the destruction of democracy. The question becomes, could a few scary stories really determine the fate of society? Research for this project is based upon a collection of articles from the UK Parliamentary archives, the British Library, the Oxford Dictionary of National Biography and other British Periodicals.

Liberal Arts.History.10

MarkJanzen

University of Central Oklahoma

Internship design and management for maximum success.

Internships are critical elements in the development of many museum professional careers, in addition to required elements of most Museum Studies programs. An internship in the right place, at the right time, with the right people can support, redirect, or define a professional's career. Whether paid or unpaid, brief or extended, local-regional-international, there are a variety of best practices for creating, maintaining and engaging internships. This poster is intended to provide advice on how to best facilitate and manage internships for maximum results.

Liberal Arts.History.11

OliviaBranscum

Southwestern Oklahoma State University

Eleanor Roosevelt: the First Lady of Human Rights

From her work for the Red Cross during World War I through her time as First Lady of the United States, Eleanor Roosevelt strove to serve all people, regardless of their race or gender. This passion to care for the dignity and rights of all continued into her years of service as the American ambassador to the United Nations. While the favored solution for long-lasting peace in the postwar era was the diffusion of democracy and economic stability for all nations, Eleanor Roosevelt believed that guaranteed human rights for citizens of all nations would ensure future world peace, and it was for this ideal that she dedicated her later years to diplomacy on the global stage. A comparison of the prevalent ideology of the time with the opinions of Eleanor Roosevelt is made possible through a review of her speeches, journal articles, and writings for the UN Human Rights Council.

Liberal Arts.History.12

RashiShukla, BethanyHolley-Griffith

University of Central Oklahoma

Outlaws & Those Who Pursue Them: Exploring Crime and Justice Through a Historical Lens in Rural Oklahoma

This poster examines the importance of historical figures and events as they relate to crime and justice in rural Oklahoma. Data were gathered through secondary historical analyses and qualitative interviews with rural law enforcement officials. Outlaws and those who pursue them have a long history in the state. From gun fights in soda shops to public hangings and manhunts, history is replete with examples of the battle for justice. Historical events and encounters serve as an important backdrop for understanding crime in Oklahoma and the work of rural law enforcement officials today.

Liberal Arts.History.13

PattiLoughlin

University of Central Oklahoma

Elizabeth Shepley Sergeant and the Origins of the Indian Arts Fund in Santa Fe in the 1920s

This project studies the journalist Elizabeth Shepley Sergeant and her role in the founding of the Indian Arts Fund in Santa Fe, New Mexico, in the early 1920s. Sergeant was one of the founding members in 1922 of the Pueblo Pottery Fund, the precursor to the Indian Arts Fund, with the goals of collecting, preserving and promoting Pueblo pottery. In 1925, the members changed the name to the Indian Arts Fund and broadened the collection to include baskets, textiles and jewelry. The larger project traces Sergeant's political activism in her work with John Collier and others as part of a community of writers, artists, and anthropologists in the American Southwest during the 1920s and 1930s. The project advances the scholarship in a number of fields, including western women's history, feminist anthropology and Native studies. Scholars Margaret E. Jacobs, Flannery Burke, and Molly H. Mullin examine women's reform networks in the Southwest and their larger national projects of preserving Native arts in the United States. We find that Sergeant and other Fund founders were motivated to revive and preserve Pueblo pottery as art rather than ethnographic object for future generations of artists and art patrons. Funding for this project was provided through grants from UCO's Office of Research & Sponsored Programs and the John Topham and Susan Redd Butler Off-Campus Faculty Research Award, Charles Redd Center for Western Studies, Brigham Young University.

JustinOlmstead

University of Central Oklahoma

'A Sludgy Amalgam': Churchill, Eisenhower, and Anglo-American Alliance Building in Europe, 1945-1955

In the wake of the Second World War, Britain still clung to its tenuous position as a world power, the United States was still getting use to the idea that it was a world power, and Europe was soon under threat from Soviet forces. Western European nations began making plans for its defense. The role Britain and the US played in this is generally understood. With the political whirlwind that was the Brexit vote and the debate about what Churchill would think, it is important to recount the positives and negatives of Churchill's post-war tenure as former prime minister and prime minister. It is equally important to examine the impact the United States, and in particular, General and future President Dwight Eisenhower had on British and European defense planning.

This paper argues that Eisenhower played a large role in forcing Churchill to acquiesce to British integration into a European defense plan. It will do so by demonstrating that Eisenhower forced Churchill to overcome his faith in a British-American partnership and accept Britain's role in the defense of Europe.

Liberal Arts.History.15

AllisonPittman

University of Central Oklahoma

Forget Me Not: The Lives, Careers, and Legacies of Norma Shearer and Joan Crawford

This project looks at the lives and careers of Norma Shearer and Joan Crawford and their contributions to Hollywood. Both actresses were popular in the golden age of Hollywood, but only one woman's career is remembered today. Joan Crawford is remembered for her roles in films like *Mildred Peirce* and *Whatever Ever Happened to Baby Jane?* While Shearer is rarely written about for her daring films of the early 1930s. Both contemporaries at the studio Metro-Goldwyn-Mayer these women had ambition and sex appeal and both brought in millions for the studio.

By referencing film scholars such as Jeannine Basinger, Lawrence Quirk, and Gavin Lambert, this project looks into why some women are forgotten and why some become icons even with a checkered personal history. The personal history of Shearer and Crawford is explored for reasons that one is remembered and the other is not. In addition, the influence of the studio system at Metro Golden Meyer is explored as a determiner of women's careers. Magazines such as *Photoplay* and personal letters are used as primary sources to show how the studio shaped these women's careers, and how they themselves shaped and responded to studio influences.

Liberal Arts.History.16

LyleSchwemley

Southwestern Oklahoma State University

LGBTQ+ History in the US from 1951 - 2015

The LGBTQ+ community has a rich history encompassing the entire span and range of human history. This project focuses on the struggle for equal rights in the United States, which begins in 1951. It is important to understand the history of underrepresented groups, especially when they have made such an impact on modern culture. Using firsthand accounts from elders, statistics, and activism history archives, the author tells the history of the LGBTQ+ community.

Liberal Arts.History.17

StephanieEasterling

University of Central Oklahoma

Childbirth in the Age of Antiquity

In the twenty-first century, women around the world give birth in a designated medical facility. Depending on the level of development among various nations, expectant mothers can either expect top quality maternal care or they must rely on local physicians and natural remedies for labor pains. In the ancient world, the services of alternative medical caregivers were the main providers for obstetrics. Mesopotamian, Egyptian, Greek, and Roman women relied on trained midwives to deliver babies and provide medical attention. Not only were midwives trained in childbirth procedures, but they were also consulted on contraception, pregnancy testing and monitoring, and options for increasing reproductive abilities. For example, the custom of confining the expectant mother in a separate room with other women and the use of birthing bricks, will provide a point of analysis. This project takes a comparative stance in exploring the methods and remedies used for childbirth and other conditions relating to prenatal and postnatal care in ancient civilizations.

Liberal Arts.History.18

KelinHaney

University of Central Oklahoma

Partition and Patriarchy: Toxic Masculinity and the Partition of India

This paper examines the role of toxic masculinity and the gendered aspects of violence that accompanied the creation of independent India and Pakistan and the subsequent partition of Punjab in 1947. While violence characterized the partition of British India into India and Pakistan for everyone involved, women faced additional and unique forms of violence. Most early research on the partition of India focused on political history. More recently scholars like Ritu Menon, Kamla Bhasin, Urvashi Butalia, and Pippa Virdee have examined the partition experience of ordinary women using interviews they conducted. This paper uses the interviews they conducted and primary documentation from the period and the years immediately following to examine the causes of the violence women experienced. This research argues that toxic masculinity influenced men's violence against women as representatives of the "other"; and against women in their own families as a preventative measure. The states of India and Pakistan also exhibited the influence of toxic masculinity in the forced repatriation of the abducted women. Understanding the causes of the unique forms of violence women face in times of intercommunal strife may help us understand and perhaps alleviate some of its effects in current conflicts.

Liberal Arts.History.19

XiaobingLi

University of Central Oklahoma

The Red Guards in the Chinese Cultural Revolution in 1966-1968

In 1966, China launched a massive movement as known as the Cultural Revolution as a power struggle between Mao Zedong and his political rivalries. Mao used the masses including students as his political instrument against his political enemies through violent means. Millions of students joined the radical organizations and attacked the governmental officials, military leaders, and school administrators. The movement continued until 1968 when Mao lost the control of the Cultural Revolution.

Liberal Arts.History.20

RebeccaDahl

University of Central Oklahoma

Styllou Christofi : Criminal Lunacy as a Defense in Court

Two murder trials in the 1950s examine the criminal justice system of discrimination towards women and people of ethnic minorities within London. This project focuses on the case of Styllou Christofi and Ruth Ellis. The Holloway prison for women is located in London, where these two were incarcerated offered medical treatment and lacked psychiatric treatment. In the UK, Parliament addressed the care of the mentally ill in three vital legislative acts. These include the Capital Punishment Act of 1868, Criminal Lunacy Act of 1884 section 2 (4), the Mental Deficiency Act 1913, and the Durham rule in 1954. The two women were executed, and it is arguable that neither of the women should have been. The crime of "passion" resulted in incarceration, court trials, and the execution. The research focuses on how the court rulings determined the psychological stability of "murderers." Press reports clearly distinguished age, race, gender, class, and religious beliefs. These trials highlight the challenges posed by poor mental health within the criminal justice and health care systems. The also research addresses how the media publicized the Ruth Ellis case in comparison to that, of the Styllou Christofi death.

KatyElmore

Southwestern Oklahoma State University

"Part of the 'We?': The German American Bund

On February 20, 1939, over twenty thousand Americans gathered in Madison Square Garden. Behind the stage was a photo of George Washington that stretched from the floor to the ceiling. People of all ages dressed in Nazi attire and, at the beginning of this infamous rally, recited the United States's Pledge of Allegiance. The activities taking place would have seemed strange and contradictory to an observer unfamiliar with the crowd, but such a mix of culture was one of the key characteristics of Amerikadeutscher Volksbund, more commonly known as the German American Bund. This poster will discuss how the German American Bund used community outreach, youth camps, and several varieties of propaganda to bring the ideology of Nazi Germany to the United States using a combination of Nazi and American rhetoric and symbolism. This distinct blend of these vastly different cultures appealed to many and created a great amount of public attention and hysteria around in pre-World War II United States.

Liberal Arts.History.22

HeatherScheele

University of Central Oklahoma

Defining Insanity: A Comparative Study of British and American Treatment of the Mentally Ill, 1880-2018

The paper explores the historical changes which are unknown in psychiatric facilities within Oklahoma and London. The changes in the mental health field involve the moral care for the mentally ill population during the 19th century and the rehabilitation process during the early 20th century. There have been gradual convergences in the treatment and care of patients in mental hospitals. These comparisons serve as a logical pairing representing a financial difference. Both represent the severity of mental illness, by applying moral treatment for insanity through disciplined living in a healthful environment and psychiatric rehabilitation emphasizing different interventions throughout the years and the investments made in Oklahoma's mental health system. The difference is exemplified with the use of training manuals in Oklahoma. These training manuals rely on the collection of documents held at the Oklahoma Archives and Records and Oklahoma federal court library. Other documents are held in London located at the British National Archives, London Metropolitan Archives, and the British Library.

The Re-emergence of Antisemitism During the Middle Ages

In the middle of the 14th century, Europe experienced one of the worst pandemics in world history: the Bubonic plague. Decimating roughly sixty percent of Europe's population (and twenty percent of the world's population), the plague caused irrevocable damage to many cities and towns, drastically altering the lives of the people in Europe. However, the ones that were the most affected were the Jews. Christians claimed that the plague were the result of people poisoning the wells. As a result, pogroms were later enacted against the Jews throughout Europe, resulting in the deaths of thousands of Jews at the hands of vengeful Christians. The Jews' situation only worsened as Christians enforced anti-Semitic political policies throughout Europe, restricting the rights of Jews and segregating them from the general population. Eventually, the hatred that stemmed from anti-Jewish sentiment culminated in the Jews' expulsion from many European nations. Forced to bear the status of refugees, the Jews traveled and settled in countries that willingly accepted them and acted as safe havens for them and their descendants. While the Bubonic plague had many unforeseen consequences for the continent of Europe, the most important one was reigniting the conflict between Christians and Jews and becoming the catalyst behind the reemergence of Antisemitism in Europe throughout the Middle Ages.

Liberal Arts.History.24

YoselynDominguez-Valdez

Southwestern Oklahoma State University

History of Mexican Immigration to the United States: The Price of Failed American Immigration Policy

This presentation looks at Mexican Immigration starting with the post-WWII Bracero Programs and the immigration issues that lead to the Immigration Reform and Control Act of 1986 during the Reagan Administration. The United States failed to create a fair and effective immigration policy while Mexico failed to protect the rights of their citizens. Through the review of the Bracero Programs, the Immigration Reform and Control Act of 1986, public response to Mexican Immigrants, and the United States Government agencies response to critics of immigration policy, this presentation analyzes the evolution of Mexican Immigration. This shows how often immigration policy was ignored or only temporary fixes were created, and the blame often fell on the immigrants instead of the inefficacy of both governments.

Liberal Arts.Political Science.01

AaronMason

Northwestern State University

The Thirteenth Amendment: Reconsidering Its Impacts on Tribal Governments and Indian Country.

Ample scholarship exists regarding American Indians and the Civil War. Likewise, an extensive amount of research concentrates upon the weakening of state power in the wake of the Civil War. However, little attention has been directed toward the constitutional connection between the Civil War Amendments and their direct impacts upon the sovereignty of tribal governments. This article attempts to demonstrate that the Thirteenth Amendment impacted the long term sovereignty of Indian Tribes by affording Congress the authority to directly expand its reach over Indian Country in ways that it had hitherto not been able to influence.

Liberal Arts.Political Science.02

YoungtaeShin

University of Central Oklahoma

Democracy contested: the Rise of Populism in South Korean and its implications

The contentious politics in South Korea was well demonstrated by incessant demonstrations by two opposing groups in the streets of Seoul in 2016, which resulted in the removal of the presiding president Park Geun Hye from office through impeachment. While protests in South Korea were by and large peaceful, succeeding years since the installment of Moon Jae In as President in May 2017 continued to show discontent among Park supporters. My poster will show how the protest began and what the populist politics means in solidifying democracy in South Korea.

Liberal Arts.Political Science.03

JeffreySikes

Southwestern Oklahoma State University

The Death Penalty: Botched Executions - Cruel and Unusual?

Do botched executions in the United States constitute cruel and unusual punishment to those condemned to the death penalty, thus violating the Eighth Amendment of the Constitution? Or does the intent to be humane override any pain and suffering caused during delivery? The United States has the distinction of being one of the last developed western countries actively practicing the death penalty. It is not, however, practiced in every state. As 2018 ended, thirty states have the death penalty on the books including the federal government and the military. Three of these states though, Oregon (2011), Colorado (2013), and Pennsylvania (2015) have governor moratoriums. Twenty states, plus the District of Columbia, have either abolished the use of the death penalty or their state courts have overturned it. The United States during its history has basically used five different forms of capital punishment: Firing squad, Hanging, Gas chamber, Electric chair, and Lethal injection. Each of these methods, except for the firing squad, has been botched in its delivery. Botched refers to the method of execution being performed poorly causing unnecessary discomfort, suffering, or pain to the person being executed. Every new method came with the promise of being more humane, but each new method largely failed to deliver in this promise.

Liberal Arts.Political Science.04

ColbyKarcher

Southwestern Oklahoma State University

Concealed Handgun Carry and Crime: A Relationship

Concealed handgun carry has been a highly researched topic in recent times. The topic of concealed handgun carry itself has several different facets and outlooks from legislation. In this research, a relationship between rates of crime, and severity of crimes, will be established with the corresponding population of concealed handgun carriers. Further, this project will delve into different crime rates among certain areas that differ in their percentages of concealed handgun carriers in the general population.

Liberal Arts.Political Science.05

MorganDuckwall

Southwestern Oklahoma State University

Oklahoma Named Number One in Incarceration Rates: Why? And What is Being Done?

The state of Oklahoma was recently named as the number one state for the highest incarceration rates in the country. This study is going to look into some of the effects of this fact. Oklahoma's incarceration rate is not comparable to its crime rate, so this study will also analyze what is instead causing the large number of inmates. Finally, it will look into what is being done to attack this issue in the state of Oklahoma.

Liberal Arts.Political Science.06

BenSchrack

Southeastern Oklahoma State University

How the Usage of Jury Challenges Impacts the Outcome of a Case.

The poster will focus on how challenges will increase your chance of winning the case. It will look at various cases where challenges were used and not used. It will also examine why the challenges were used. After examining these cases I will divide up categories and see what types of challenges are most likely to win in certain cases. I will pair up different types of challenges with other types to see how to maximize the chance of winning a case through the usage of jury challenges.

Liberal Arts.Political Science.07

TyHaight

Southwestern Oklahoma State University

Environmental Law: A Brief Summary and Its Impact

The impact of environmental laws and regulations may not be inherently evident, but instances where proper protocol isn't followed can affect millions such as the infamous Flint, Michigan water crisis. In my research presentation, I lay out the timeline of how the Environmental Protection Agency (EPA) came to be during the Nixon Administration, as well as the key cases leading up to present day. This also includes pivotal decisions made in this state regarding dumping waste in the Illinois River, the creation of superfund sites such as Picher, Oklahoma, and the increase of earthquakes. At the federal level, the current administration has been clear in favoring deregulation along with placing nonrenewable-resource-executives in positions of power of the agencies set out to regulate them. The urgency to act on behalf of future generations has been growing with every scientific report coming to similar conclusions; that the gap between now and the point of no return is closing, and the decisions made in this next decade will directly influence the lives of billions of people.

Liberal Arts.Political Science.08

TrevorCohee

Southwestern Oklahoma State University

Inconsistencies in Sentencing in America Today

This project explores the punishment and sentencing processes of the American criminal justice system, including the purpose of sentencing, the structure of sentencing, and most importantly the problems and impact inconsistencies have in the sentencing process. The focus of this project will be on sentencing disparity, what causes it, why it is a problem in the criminal justice system today, and several solutions that could help fix it. A situation in which two individuals commit similar crimes but do not receive similar punishments is known as sentencing disparity, and it happens more often than one would think. Sentencing disparity is the result of a wide amount of circumstances stemming from but not limited to things such as : judicial discretion, mitigating circumstances, aggravating circumstances, how the crime affected the victim, location of the crime committed, federal court versus a state court, race and gender, etc. In my project I will give a few ways that I think would help diminish sentencing disparity such as giving less discretion to judges and replacing that discretion with a universally used grid/system of determining a sentence that is used by all states in the US, and to change the minimum age at which a juvenile could be charged as an adult as a federal law; synonymous in all states.

Liberal Arts.Political Science.09

CalebBlanchard

Southwestern Oklahoma State University

The State of Oklahoma's Religious Bias as Reflected in Legislation and in the Capitol.

When one thinks of the United States the thought of an American Dream/melting pot often comes to mind. This is why the U.S. has remained a pinnacle of immigration. However, the same nation that encourages all walks of life to migrate here, is still "A Nation Under God." These ideals often present themselves in Oklahoma politics as well, seeing as how the state, due to its demographic, rests in the bible belt. So the State of Oklahoma is not too friendly to those of other faiths that are not protestant or other branches of Christianity. Research will show that past and present Oklahoma Law and Capitol decisions tend to be biased toward Protestantism.

Liberal Arts.Political Science.10

BradyReinke

Southwestern Oklahoma State University

Legal Discrimination?

When the words "legal" and "discrimination" are placed together in 2019 you can feel the tension. In this research topic, the awkward ins and outs of legal discrimination will be explored. Furthermore, many examples will be used to show how this legal phenomenon plays out in American society. Specifically, time will be spent looking at the contentious line that has been drawn as to what constitutes legal or illegal discrimination.

Liberal Arts.Political Science.11

KitChavez

Southwestern Oklahoma State University

Graduation From Primary School to Prison

Murder is the most serious crime that can be committed by mankind. What drives a person to take a life is a mystery that can be unsolved for years. For a child to commit a serious crime is rare, but for a child to commit a murder is even rarer. While an adult killer is assumed to be evil, a child is seen to be innocent that they would never spill blood of another. This poster will analyze why the child committed the crime, factors that drove them to do the act and the punishment they received. Whether they are victims of their environment, their own curiosity or just wanted to display their power, these children have committed some of the most chilling murders in the world. The focus will be child murders age sixteen and under at the time of the crime and in the USA only. This poster will display their unique cases and what became or will become of them.

Liberal Arts.Political Science.12

HeatherKatz

Southwestern Oklahoma State University

Fixed Wireless Broadband: A Policy Alternative?

Digital divides persist in many forms. In the US, fixed wired broadband speeds as defined by the FCC (25/3 Mbps) are not widely available in rural and tribal areas. Additionally, the policy environment is not conducive for state intervention, as entrenched ISPs often campaign against municipal broadband projects. Few scholars have addressed the development of fixed wireless broadband (FWLB), and those like Middleton and Given (2011) cannot address how recent technological and policy developments have affected its rollout. This paper will address to what degree FWLB is a viable alternative to fiber-to-the-home (FTTH) and the roadblocks providers and users face. This study will rely on survey data and interviews in the rural Midwest. FWLB is a tantalizing solution to policy roadblocks of providing wired broadband to populations outside of urban areas, but also faces its own set of barriers. The need to understand how to deal with the persistence of the digital divide in the US will help improve access for individuals and communities in less populated areas globally.

Liberal Arts.Political Science.13

RyleighCooper

East Central University

MC to WC

This research explores the relationship between access to toilets at school and the amount of women in politics. It is hypothesized that the more women that are present in politics the more toilets there are. This hypothesis will be tested by gathering quantitative research on access to private toilets at schools in Africa and the amount of active women in the government in various African countries. This research is important because if a link to these variables is established it might suggest a strategy for expanding the amount of toilets in schools in Africa, thus educational attainment.

Liberal Arts.Political Science.14

HeatherHall

East Central University

The End. Period.: How Menstruation Affects Educational Attainment in Developing Countries.

This research explores the relationship between access to toilets at schools in developing countries and female educational attainment. It is hypothesized that girls drop out of school when they hit maturity if they don't have access to a private toilet at school. The hypothesis will be tested by gathering quantitative research on access to private toilets at schools and levels of educational attainment by females in various developing countries. This research is important because if a link between these variables is established it might suggest a strategy for expanding the education of women.

Liberal Arts.Political Science.15

MorganDuckwall

Southwestern Oklahoma State University

Oklahoma is Named Number One in Incarceration Rates: Why? And What is Being Done?

The state of Oklahoma was recently named as the number one state for the highest incarceration rates in the country. This study is going to look into some of the effects of this fact. Oklahoma's incarceration rate is not comparable to its crime rate, so this study will also analyze what is instead causing the large number of inmates. Finally, it will look into what is being done to attack this issue in the state of Oklahoma.

Liberal Arts.Political Science.16

Dae'lynSmith

Northeastern State University

Higher Education Affordability and Public Policy

This paper focuses on higher education affordability across the United States. I examine the history of the issue, why it should matter to both students and the public and the current opinions of both political parties. I analyze the federal education policy from both the Obama administration and the Trump administration and I compare affordability and access across the country. After determining what the issue is and why it matters, I examine and present various policy solutions, alternatives and recommendations.

Liberal Arts.Political Science.17

Air-EaunaWarrior

East Central University

The Importance of Hygiene and Sanitation Facilities for Women.

The research examines the importance of hygiene and sanitation in schools for girls. I hypothesized that if the bathrooms in schools in Africa are unsanitary, and filled with thousands of germs and bacteria, less girls would want to use them due to the exposure of infections and diseases. To test my hypothesis, I will gather information from different students around campus that are from Africa, and interview them and ask what type of conditions they had to deal with when it comes to boy and girl restrooms at their schools. This research will help bring awareness to how filthy such as a restroom can be if not kept clean and sanitized on a daily. This research will also bring awareness to the inequality of boys and girls, and the upper class and lower class.

Liberal Arts.Political Science.18

danbrown

Southwestern Oklahoma State University

"REFLECTIONS OF MURDER"

THIS PRESENTATION WILL ANALYZE CASES IN THE AMERICAN CRIMINAL JUSTICE SYSTEM INVOLVING WOMEN WHO HAVE BEEN CHARGED WITH THE CRIME OF MURDER.

THE ANALYSIS WILL EVALUATE CASES IN WHICH A WOMAN HAS INTERPOSED DEFENSES OF SELF-DEFENSE, MENTAL ILLNESS AND "THE BATTERED WOMAN'S SYNDROME.

Liberal Arts.Political Science.19

AshlinMurray

Southwestern Oklahoma State University

Gender Discrimination in American Elections

Recent years have seen a heightened participation by women in Presidential elections. Research will address the issue of gender discrimination as it relates to elections, particularly Presidential elections, as well as the driving forces behind discrimination in the election process. The study will examine the history of women involved with American Presidential elections, the successes and failures of female campaigns, and the electoral trends that have led to these campaign losses.

Liberal Arts.Political Science.20

JeffreyShafer

East Central University

The Benefit of Living in the City: The Link Among Urbanization, Toilet Access, & The Education of Girls

This research explores the relationship between urbanization and the access to toilets and how this affects education of girls in Africa. It’s hypothesized that with the lack of urbanization brings lack of proper bathrooms, which negatively affects girl’s education. The hypothesis will be tested by collecting data on urban areas with proper sanitation versus rural areas with poor sanitation and how girl’s education is affected. This research is important because it could establish a link between rural areas and poor education of women.

Liberal Arts.Political Science.21

LaurenHughes

Southwestern Oklahoma State University

Gender Equality in the U.S. Legal System

In a time when gender equality is such a prevalent topic of discussion in our country. Also, in a time when the “#MeToo” movement is such an important and big part of the conversation. Women are questioning whether there is equality in our legal system. In my research I plan to look at different cases in the U.S., and compare numbers found in this research. In conclusion, I plan to compare these numbers and cases and decide whether there is really gender equality in our legal system. Whether women are equally represented and equally heard in their trials. I don’t plan to focus on outcomes of these trials just whether or not men and women are receiving the same treatment in their trials.

Liberal Arts.Political Science.22

AlexCourtney

East Central University

From "I Do" to "You're Fired!": A comparison of LGBTQ+ Political and Legal Strategies in the United States.

In the United States, you can get married to your same-sex partner one day and fired for being gay the next day. Historically LGBTQ+ people have been given their rights through the Privacy Clause found in the Fourteenth Amendment. That was until gay marriage was legalized nationwide using the Equal Protection Clause. This presentation will explore the legal precedence of firing someone for being LGBTQ+ along with the past and present political advocacy strategies for LGBTQ+ anti-discrimination laws. The research will show why an Employment Non-Discrimination case hasn't been ruled on by the Supreme Court and why Congress and many state legislatures haven't created statutes protecting LGBTQ+ people.

Liberal Arts.Political Science.23

BaileyMcKay

Southwestern Oklahoma State University

Upholding the Status Quo: An Analysis of the 2018 Alabama Governor's Election

The totality of conservative control in Alabama is comprehensive, encompassing partisan offices from the local level through the governorship and all state and national representatives, excluding a surprise upset when Democrats won the vacant senate seat after President Trump called Jeff Sessions to Washington to serve as Attorney General. This state of affairs did not happen in a short period of time. Conservatism has its roots in the deep south before the modern political system, as will be discussed later. These roots cemented Republican control in Alabama politics to such a degree, that over time, it has made it extremely difficult to challenge Republicans on any level. As a result, is it of no surprise that the Democratic candidate failed to win the 2018 Governor's election.

Liberal Arts.Political Science.24

MychalBarnett

East Central University

The Role of Water as a Cultural Resource in the Seminole Tribe of Oklahoma

This research explores how water is used as a cultural resource or if it is, when making water policy. I will focus on the Seminole Tribe of Oklahoma. I hypothesize that the cultural values are very important when making water policy. I will test my hypothesis relying on qualitative methodology and interview the cultural experts of this tribe. This is important because it will prove that the Seminole tribe takes the history of the tribe into consideration when making water policy.

Liberal Arts.Political Science.25

LillyanPalmer

East Central University

Water Policy in the Caddo Nation: How Cultural Values Affect Water Policy Making

This research explores the degree to which Native American tribes in Oklahoma incorporate cultural values when making water policy. I will focus on the Caddo Nation of Oklahoma. I hypothesize that the Caddo Nation of Oklahoma considers cultural values when making water policy. To test my hypothesis, I will rely on qualitative methodology and interview tribal officials. This research is important because it will help to demonstrate how tribal water policy making occurs in an Oklahoma tribe.

Liberal Arts.Political Science.26

AndrewKelly

East Central University

Water Policy in the Caddo Nation: Does culture matter?

This research focuses on the water policy that the Caddo Nation has instated and its relation to the cultural values the Nation possesses. I posit that the Caddo Nation's water policy is influenced by those cultural values. To investigate this, qualitative measures will be used along with personal interviews of members of the Caddo Nation.

Liberal Arts.Political Science.27

YoselynDominguez-Valdez

Southwestern Oklahoma State University

INFLUENCE OF SOCIAL MEDIA ON THE ELECTION OF ALEXANDRA OCASIO-CORTEZ

This presentation will analyze the 2018 midterm election race for the then-candidate for District 14's seat in House of Representatives, Alexandra Ocasio-Cortez. It will analyze the influence that social media had on Alexandra Ocasio-Cortez's campaign by first, considering how it helped her gain momentum during her race as a populist candidate, and second, how this could impact the Democratic Party. She was a front runner since announcing her candidacy and astonishingly beat out incumbent Joe Crowley. Her social media presence and her appeal to the Hispanic demographic of Queens and the Bronx paved the way for her success. Her social media presence has helped increased her popularity on the left and has created significant turmoil among supporters on the right. It is still soon to determine if there will be a lasting impact on the Democratic party; however, it has spiked a trend in social media involvement from other legislators. Data were gathered through media and newspaper articles and as well as polling results.

Liberal Arts.Political Science.28

CamdonMaydew

Southwestern Oklahoma State University

Effective Gun Control

Today many are calling for more strict regulations on guns. I will describe some of the laws that are already in place to help limit death and destruction and whether these laws are effective or not. I will also describe some laws that could be potentially more effective and what difficulties there could be in implementing these laws.

Liberal Arts.Political Science.29

DylanPennello

Southwestern Oklahoma State University

Common Law V Sharia Law

In this years Political Science Oklahoma Research Day, I shall be constructing my poster and presentation over the commonalities and differences among the common law and sharia laws in different countries. I will be discussing the pros and cons of both laws in an attempt to determine which of the laws, if not a combination of both, have the best effect on stopping or deterring criminal offenses. I will further discuss the use of different heights of punishments when it comes to a capital offense or even a simple criminal offense. In the use of different laws, we will notice a change in degree of criminality over different offenses and how the government handles the predicament of a situation and that its what I am going to do my research over.

Liberal Arts.Political Science.30

AaronCornell

Southwestern Oklahoma State University

An Examination of the 2018 Illinois Governor Race

During the 2018 Midterm elections, Democrat J.B. Pritzker comfortably defeated Republican incumbent Bruce Rauner by a margin of over 15% to become Governor of Illinois. The margin by which Pritzker defeated Rauner disguised how competitive and complicated this race actually was. The Illinois Governor race illustrated many of the modern issues in American politics ranging from racial tensions, to negative attack ads and big money. This project explored how these major factors effected the outcome of the gubernatorial election. It also highlighted other issues effecting the State of Illinois including; budget crises, years of persistent violent crime, and multiple corruption scandals. This project's presentation also provided visuals of state demographics, voting maps, and the amounts of money spent by both the major party candidates.

Liberal Arts.Political Science.31

BrittanyCano

Southwestern Oklahoma State University

Journalism: Shifting How Americans View Politics.

In this presentation, we will contributing to the conversation of how journalism has changed the way Americans view politics. The purpose of this presentation is to discussion how journalism, biased and false new pieces are contributing to the ever growing divide between Americans. This will include statistics from Pew Research Center and other research and authors who have went great lengths to contribute to this conversation as well.

Liberal Arts.Political Science.32

CatherineVaughn-Hetzel

East Central University

Title: Adoption Equality for All: An Analysis of State Law

Abstract: In this paper I will talk about adoption rights for LGBTQ individuals in the United States and how it affects both the children and the applicants. I will be looking at how adoption differs for each state. For example, I examine whether the state allows second parent rights and whether the state allows a LGBTQ couple to perform step parent adoptions. I discuss the Constitutionality of adoption rights under the doctrine of privacy and the role that religion plays in state adoption laws. Although support for the LGBTQ community has gone up significantly there are few laws to stop discrimination and protect LGBTQ individuals on their quest to become parents.

Liberal Arts.Political Science.33

DannyTiger

East Central University

Seminole Nation of Oklahoma's Tribal Culture Impact on Water Policy.

This research explores the degree to which the Seminole Nation of Oklahoma incorporates cultural values when making water policy. I hypothesize that the Seminole Nation of Oklahoma considers cultural values when making water policy. To test my hypothesis, I will rely on qualitative methodology and interview tribal officials, elders, and leaders. This research is important because it will help demonstrate how tribal water policy making occurs in the Seminole Nation of Oklahoma.

Liberal Arts.Political Science.34

MichaelMills

Southwestern Oklahoma State University

Impact of the Bible in America

This presentation will analyze the various laws in America and their relationship to Biblical principles and laws. The analysis will demonstrate the close relationship between American justice and ideals found in the Torah. The presentation will show the Judeo-Christian roots of many American laws as well as the impact of Old Testament ideals on American Justice from historical to current perspectives. The research will further analyze the impact of the Old Testament on American political beliefs and American lawmaking and demonstrate the change in America's adherence to these Biblical ideas.

Liberal Arts.Political Science.35

MellissaTelena

East Central University

Tribal water policy in Oklahoma with emphasis on cultural ways.

Research question: Water policy between the native tribes of Oklahoma and state regulations?

H1: The Choctaw tribe will seek rights to water in order to protect their cultural rights with water.

This paper examines how they will incorporate their cultural views and ways into water policies. I will focus on the Choctaw tribe of Oklahoma and their culture with water. I will be doing this by visiting tribe council members along with other members of the tribe. Doing extensive research on the water policies from court cases and documents will also be a big guide in my water policy project poster and paper.

Liberal Arts.Political Science.36

JacobRiddle

East Central University

The Five Southeastern Tribes: How They Help You

This research explores what public services the tribes offer to non-tribal people. I will focus on the five southeastern tribes of Oklahoma.I hypothesize that the tribes offer public services to non-tribal people. To test the hypothesis, I will build a database of public information to evaluate how tribes benefit non-tribal people.

Liberal Arts.Sociology.01

ElizabethMaier

University of Central Oklahoma

Challenges to Addressing Mental Health Calls for Service

For decision makers to formulate effective policing, programs, and procedures addressing mental health and law enforcement related matters, they must have accurate data on the various issues impacting law enforcement operations. This research examined data available to law enforcement regarding mental health calls for service and its impact on the department. Data from a metropolitan police department's dispatch and patrol records, and state department of mental health were analyzed. This poster illustrates data quality problems, challenges to law enforcement, and possibilities for improvement. The following challenges were found: increased mental health calls for service, increased transportation costs, training issues, etc. Potential solutions and collaborations were studied from around the nation. This research was presented to the Police Chief and Deputy Chief of the police department for their consideration.

Liberal Arts.Sociology.02

JaimeBurns

University of Central Oklahoma

The Money Pit: Modernizing the "Modern" Jail

The purpose of this research is to discuss the history, challenges, and dysfunctions of a Midwestern county jail. In the background, there are jail deaths, inadequate data-gathering practices, management and infrastructure problems, and the potential taking of control by the federal government. One aspect of this research examines the facilities and infrastructure of the jail which, at the time of creation, was deemed functional. Examples of the data challenges will be provided and analyzed. The likelihood of this county building a new, more up-to-date jail will be examined. Finally, we examine the impact of culture on sustainable changes within the jail.

Liberal Arts.Sociology.03

MichelleLopez

University of Central Oklahoma

Gottman's Four Horsemen and Attachment Styles

This present study was done to see the correlations between Gottman's (1999) four horsemen of the apocalypse for relationships (Criticism, Contempt, Defensiveness, and Stonewalling) and one of the four attachment styles (Bartholomew & Horowitz, 1991) (Secure, Fearful Avoidant, Dismissive Avoidant, and Anxious Preoccupied). The research questions are four hypotheses embedded within: (1) There will be a positive relationship between responses on the Secure category and Criticism in the Gottman model. (2) There will be a negative relationship between responses on the Secure category and Contempt in the Gottman model. (3) There will be a positive relationship between responses on the Secure category and Defensiveness in the Gottman model. (4) There will be a positive relationship between responses on the Secure category and Stonewalling in the Gottman Model. An online survey was sent out to a mid-sized university, and 280 participants responded to the survey. Students, faculty, and staff were eligible to respond to the survey. Results from the survey concluded that there were negative relationships between responses on the Secure category and Contempt, Defensiveness, and Stonewalling in the Gottman model. Findings found a positive relationship between responses on the Secure category and Criticism in the Gottman model.

Liberal Arts.Sociology.04

RashiShukla

University of Central Oklahoma

Small Towns, Big Problems: Exploring Crimes and Challenges of Rural Law Enforcement

This poster examines varying types of rural crime and the challenges faced by rural law enforcement in Oklahoma. Data were gathered through in-person interviews with rural law enforcement personnel, a survey of attendees at a rural crime training session, and an internet survey of statewide law enforcement organizations. Ranging from cattle theft to stolen farming equipment, rural law enforcement must work unique crimes with dwindling resources. With the livelihood of hard-working individuals at stake, the research presented stands as a testament for the necessity of understanding rural crime.

Liberal Arts.Sociology.05

KaylanPeterson

University of Central Oklahoma

Reflective Quizzes and Personal Development

The purpose of this research is to gain a better understanding of the impact of self-reflective writing assignments have on self-awareness and self-compassion. Several current research efforts in Transformative Learning indicate students lack of sense of personal understanding, illustrating a need for classroom experiences to build into more than merely disseminating information about a subject (Christie, Care, Robertson, and Grainger, 2015). This project attempted to use reflective writing exercises to increase personal depth and transformation in the students. It is the goal of this study to identify whether the assignments increase course knowledge and or classroom engagement. This research is comprised of students on the first day of class being introduced to the study, consented, and given Neff's Self-Compassion Scale, Emotional Self-Awareness Scale, demographic survey, and a five conditioned Q-sort of 18 adjectives which can be used to define aspects of personality. Though each student completed the 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 assessment to ascertain growth. We expect to find such assignments will inspire reflective thinking about perception of self.

Liberal Arts.Sociology.06

Karel Kalaw

University of Central Oklahoma

“Ama ng Tahanan”: Masculinities and Transnationalism in Later Life

This study sought to address the sparse literature on men’s accounts on their inner worlds as juxtaposed to different spaces, e.g. personal and public. Specifically, this study explored and accounted the return experience of six (6) returnees after overseas work as refracted by age. The experience of old age of overseas male Filipino workers highlights the intersectionality of the event of old age and labor migration. The question explored was, “What is old age?” for these overseas Filipino returnees. This qualitative study is innovative as it connects several concerns in the gradual and increasing dialogues about the demand for migrant workers as juxtaposed to the graying population globally. Their return stories with the event of old age and their reentry to their families and community offer an opportunity to shed understanding on this urgent and relevant social phenomenon.

Liberal Arts.Sociology.07

JenniferBrown

University of Central Oklahoma

Before and After the Me-Too Movement: An Exploration of Women's Participation in Governance.

An exploration of women's participation in all three branches of government from the beginning of the republic up to the me-too movement. Political participation of women in the democratic process is a significant indicator of the development and effectiveness of a country. This research will purposely examine the percentage of women voting, holding elected office at the federal level and specifically in the state of Oklahoma. Analyses may be separated by party affiliation, race and age, given data publication availability. Early research suggests while women are increasingly active in governance gender parity is still elusive.

Liberal Arts.Sociology.08

AprilLi

Southwestern Oklahoma State University

Is AlphaGo Beating Humanity?

In her presentation, April Li will lead you into the field of the board game Go, including when it was invented, how people play it, and some fun facts about it. She will not only talk about the background of Go, but also introduce when and how AlphaGo, the artificial intelligence that beat down the best Go player in 2017, was created and how it had developed. Moreover, she would like to invite you to find out what we can do with AlphaGo and what occupations are likely to be replaced by it in the future.

Liberal Arts.Sociology.09

Shih-HanTsai

Southwestern Oklahoma State University

Drink Hot Water!

Shih-Han, Tsai from Taiwan, is going to look into why American people drink cold water to refresh themselves all the time, while Taiwanese people believe that drinking cold water can be harmful to their health. In her research, she will firstly show the result of her campus survey on the ratio of people drinking cold water to people drinking hot water. In addition, she will bring in the belief of drinking hot water from her home country, and address the benefits and the disadvantages of both cold water and hot water to the audience. Through her research, Shih-Han, Tsai hopes to raise the audience's awareness of the pros and cons of drinking cold water and hot water.

Langston University

Effects of Lespedeza Condensed Tannins Alone or With Monensin, Soybean oil, and Coconut oil on Feed Intake, Growth, Digestion, Ruminant Methane Emission, and Heat Energy by Yearling Alpine Doelings

The primary objective was to determine if greater effects of forage condensed tannins on ruminal emission of the greenhouse gas methane could be achieved by simultaneous use of other rumen modifiers. Yearling Alpine doelings (55) consumed 75% forage diets in a 12-week trial. Alfalfa was the forage in the control (C) diet, and others consisted of Sericea lespedeza resulting in an average dietary condensed tannin level of 8.4%. Lespedeza treatments were no additive (L) and inclusion of monensin (I) at 22 mg/kg (dry matter; L-I), soybean oil (SBO) at 3% (L-S), coconut oil (CCO) at 3% (L-N), I and 3% SBO (L-I-S), I and 3% CCO (L-I-N), 1.5% SBO and 1.5% CCO (L-S-N), and I, 1.5% SBO, and 1.5% CCO (L-I-S-N). Dry matter intake (1.47, 1.27, 1.29, 1.19, 1.33, 1.14, 1.08, 1.14, and 0.98 kg/day), average daily gain (122, 79, 89, 83, 100, 76, 70, 78, and 65 g), and total tract digestibility of organic matter (57.4, 50.9, 51.8, 52.7, 50.3, 52.1, 52.1, 51.9, and 49.8% for C, L, L-I, L-S, L-N, L-I-N, L-S-N, and L-I-S-N, respectively) were greater for C than for lespedeza treatments. Ruminant methane emission was lower for diets with lespedeza relative to intake of gross energy (5.9, 3.3, 3.5, 3.2, 2.8, 2.9, 3.2, 3.2, and 3.3%) and digestible energy (11.2, 7.0, 7.4, 6.4, 5.9, 5.7, 6.4, 6.4, and 6.7% for C, L, L-I, L-S, L-N, L-I-N, L-S-N, and L-I-S-N, respectively). In conclusion, the effect of lespedeza condensed tannins on methane was not influenced by monensin, soybean oil, or coconut oil.

Mathematics and Science.Animal Science.01

& Mathematics and Science.Animal Science.02

& Mathematics and Science.Animal Science.03

& Mathematics and Science.Animal Science.04

Langston University

Langston University

Effects of Different Levels of Lespedeza and Supplementation With Monensin, Coconut oil, or Soybean oil on Ruminal Methane Emission by Mature Boer Goat Wethers After Different Lengths of Feeding

The effect of forage condensed tannins on ruminal emission of the greenhouse gas methane was compared with those of other rumen modifiers. Mature Boer goat wethers (36) consumed pelleted alfalfa hay (CON), Sericea lespedeza hay (HSL; 6.4% condensed tannins), a 1:1 mixture of alfalfa and lespedeza (MSL), or alfalfa with monensin (ION; 22 mg/kg), coconut oil (CCO; 4%), or soybean oil (SBO; 4%). Total dry matter intake in the 20-week study (3.86, 3.75, 3.52, 3.69, and 3.64% body weight) and total tract organic matter digestibility determined every 5 weeks (72.8, 69.5, 70.3, 72.0, and 71.1% for CON, MSL, HSL, ION, CCO, and SBO, respectively) were not affected by treatment. Ruminal methane emission was not influenced by period but was greatest among treatments for CON expressed as percentages of gross (10.3, 6.8, 6.3, 7.2, 6.5, and 6.5%) and digestible energy (14.8, 10.2, 9.3, 10.6, 9.8, and 10.1% for CON, MSL, HSL, ION, CCO, and SBO, respectively). In conclusion, a 1:1 mixture of alfalfa and lespedeza, with a low to moderate level of condensed tannins, had similar effect on ruminal methane emission as lespedeza as the sole forage (31 and 37% decreases relative to digestible energy intake, respectively). Inclusion in basal alfalfa diets of monensin and coconut and soybean oils elicited similar decreases in methane emission (28, 34, and 32%, respectively). There was no evidence of adaptation to any of the modifiers, with methane emission determined in weeks 5, 10, 15, and 20.

Effects of Gestation Nutritional Plane and Diet Nutritive Value During Lactation on Feed Intake and Digestion in Lactating Alpine Goats

Alpine goats (55) were used to evaluate effects of nutritional plane during gestation for 28 weeks (High- and Moderate-GES) and diet nutritive value (High- and Moderate-LAC) during the first 16 weeks of lactation on feed intake and digestion. Initial body weight and body condition score (BCS; 1-5) in gestation was 57 kg and 2.32, respectively. At 11 days before kidding, body weight was 78.2 and 73.5 kg and BCS was 3.17 and 3.02 for High-GES and Moderate-GES, respectively. Both lactation diets included 20% alfalfa hay and 10% cottonseed hulls, whereas High-LAC and Moderate-LAC contained 10 and 20% grass hay, 12.9 and 10% wheat middlings, 12.9 and 10% rolled oats, 3 and 2.5% soybean oil, and 5 and 2.5% molasses, respectively. The High-LAC and Moderate-LAC diets were 72.7 and 64.4% TDN, respectively. Intake of DM (3.74, 3.56, 4.15, and 3.74% body weight), digestibility of organic matter (78.0, 75.8, 78.3, and 78.8%; SEM = 1.62), and digested organic matter intake (1,911, 1,883, 2,204, and 1,881 g/day for High-GES/High-LAC, High-GES/Low-LAC, Low-GES/High-LAC, and Low-GES/Low-LAC, respectively) were not affected by gestation nutritional plane, diet nutritive value during lactation, or their interaction. In conclusion, differences in digested organic matter intake suggest potential benefit from use of a high quality diet during lactation subsequent to a moderate nutritional plane during gestation.

ArthurGoetsch, TerryGipson, RyszardPuchala

Langston University

The Varying Relationship Between Packed Cell Volume and Fecal Egg Count in Different Breeds of Hair Sheep and Meat Goats Artificially Infected with *Haemonchus Contortus*

The objective was to evaluate the relationship between packed cell volume (PCV) and fecal egg count (FEC) with growing hair sheep and meat goats in 3 central sire performance tests. There were 52 Dorper (DOR), 96 Katahdin (KAT), 49 St. Croix (STC), 48 Boer, 55 Kiko, and 57 Spanish (SPA) males used. Animals were dewormed then dosed with 10,000 infective *Haemonchus contortus* larvae, with PCV and FEC determined 21, 28, 35, 42, and 49 d later. The PCV and FEC were correlated for DOR, KAT, STC, Boer, and Kiko ($r=-0.22$, -0.49 , -0.28 , -0.43 , and -0.23 , respectively) but not SPA. A mixed effects model for each species included fixed effects of breed, year, breed \times year, day as a repeated measure, and log transformed FEC ($\ln\text{FEC}$) and $\ln\text{FEC}\times\text{breed}$ as covariates. Breed affected PCV in goats (24.9, 27.1, and 25.9% for Boer, Kiko, and Spanish, respectively; $\text{SEM}=0.42$) but not in sheep. There were effects of $\ln\text{FEC}\times\text{breed}$ and the coefficient differed from 0 for DOR, KAT, STC, Boer, and Kiko (-0.0011 , -0.0005 , -0.0006 , -0.0005 , and -0.0009% per egg) but not Spanish. In conclusion, PCV does not appear highly reflective of FEC in Spanish goats infected with *H. contortus*, and the nature of the relationship varied among other breeds of sheep and goats. Based on the magnitude of the $\ln\text{FEC}\times\text{breed}$ coefficient, Dorper sheep and Kiko goats incurred relatively greater reduction in PCV as FEC increased, and correlations indicate strongest relationships for Katahdin sheep and Boer goats.

Langston University

Goats for Controlling Redcedar in Oklahoma and Missouri

The objective of this study was to evaluate the degree of redcedar control by goats at sites in Oklahoma and Missouri. There were three research plots in Oklahoma with eight goats each: Langston, Oklahoma City and Mannford, and one in Neosho, Missouri, with 12 goats. All plots were 0.81 hectares. The redcedar population was inventoried, quantified as to height, width, and GPS coordinates during the summer of 2016. One year later, trees were scored for browsing: 0 being unbrowsed, between 1 and 5 medium browsed and from 5 to 9 was considered severely browsed. Percent of trees dead (0% green) or live according to size (short; $\leq 1.83\text{m}$ or tall; $> 1.83\text{m}$) were analyzed using Chi-Square statistics. A subsequent multiple regression analysis was conducted for tree height, tree width, and browsing score. The goats in Neosho killed 18% of the trees, as compared to 1% at other locations ($P<0.001$). A greater percentage of trees in Neosho were more severely browsed than the average at the three sites in Oklahoma, 60% and 8% respectively ($P<0.001$). In Mannford, the shorter trees were most scored as medium browsing than the taller trees (1.97% vs. 1.68%, $P<0.05$). In Oklahoma City, the taller trees were more severely browsed than the shorter trees (6.88% vs. 4.93%, $P<0.05$), although more short trees were killed by browsing ($P<0.05$). This may indicate that shorter trees are more sensitive to browsing. Redcedar trees were more effectively controlled by goats in Neosho, Missouri.

FUNCTIONAL INSECT PROTEIN EXTRACTS FOR FOOD APPLICATIONS

The world population has been increasing rapidly which results in high demand for a nutrient dense food supply. Conventional animal protein sources may be insufficient to meet this need, subsequently opening a door to alternative sources. Edible Insects are, in general, rich in protein, Vitamins, Minerals and can provide all the essential amino acids, unsaturated fatty acids and micronutrients. This study suggests Cricket (Gryllidae), is a potential source of protein for human consumption.

In this study protocol, Ethanol (99.5%) and Hexane (100%) was used for defatting cricket powder at a solvent to material ratio of 5 mL/g. The solution was centrifuged at 4800 rpm for 10 minutes. The filtrate was then passed through nitrogen gas. The fat and the solvent were separated using a rotary evaporator and the fat percentage was calculated. The ethanol and hexane de-fatted powder was used for protein extraction by NaOH and freeze dried to a powder. The extracts were then analyzed for amino acid composition and various functional properties.

The consumption of insects therefore contributes positively to the environment, food and nutritional security for present and future generations. The afore-stated method shows that insects can be used as an alternate source of protein. The future investigation of this research will be to incorporate the protein powder in low nutrient dense foods, study its properties, and analyze the use of insect-based protein powder.

Supplementation of Herbanimal® Extract in Drinking Water of Broiler Chickens Improved the Oxidative Stress Status

The objective of this study was to assess the oxidative stress status in broiler chickens which received either Herbanimal® extract supplements in water or an antibiotic (ANT) in diet.

We hypothesized that Herbanimal® extract can improve the oxidative stress status in chickens and be used as an alternative to antibiotics.

A total of 120-day-old male broiler chicks were randomly divided into 24 pens with 5 chicks per pen. All birds were weighed and randomly subjected to one of two treatments (60 birds/treatment, 12 pen/treatment) for 6 weeks: 1) ANT: standard commercial diet supplied with an ANT, and 2) HBS: control/standard diet without ANT with supplemented Herbanimal® in drinking water (4 ml/L). On week 5, after sacrificing a subgroup of birds (10 birds/treatment), blood and liver samples were collected and stored at -80C until further analysis. The mean of measured variables between the two groups was separated by paired Students t-test.

The total antioxidant capacity of the liver was higher for the HBS group compared to ANT group. In addition, the HBS birds had improved plasma superoxide dismutase and catalase activity when compared to their ANT counterparts. Overall, Herbanimal® supplementation in water improved the oxidative stress status of broiler chickens. This together with our previous data on growth performance indicates that herbal extracts can be considered a safe alternative to ANT in poultry production.

PatriciaWilliams

Tulsa Community College

Methods for Shell-Less Incubation of Poultry

Broken or cracked shells can mean the loss of valuable hatching eggs for individuals who work with poultry or other birds. If a method can be devised for shell-less incubation, these eggs could potentially be saved. Based upon my knowledge of incubation and research on the subject I predicted that the eggs placed in the artificial environment could reach maturity after a 21-day incubation period but at a lower rate than normally incubated eggs. I also predicted that the addition of calcium would improve the hatch rate. For this research, an artificial vessel was created using PVC pipe or glass jars, and eggs were incubated in three groups with three subgroups, each incubated using different protocols. Each artificial vessel was covered with cling wrap to act as a barrier for gas exchange. All eggs were incubated in Little Giant Styrofoam incubators set at 99.5°F with the humidity between 50-55%. During incubation, data was collected on the number of embryos alive at three-day intervals and charted to determine the best conditions for optimal survival rates. Data compiled during the incubation process showed that eggs supplemented with calcium did have better survival rates than non-supplemented eggs. The eggs incubated in the PVC environments showed better embryo growth than those in the glass jars which showed no embryo growth at day three. I was able to grow one embryo to day nine of incubation with the addition of calcium and antiseptic in the PVC environment.

Mathematics and Science.Biology.01

NingWu, TeresaGolden, BradLudrick, TaylerHedgecock

Southeastern Oklahoma State University

The molecular mechanisms and the applications of reserpine induced rodent model

Reserpine, an indole alkaloid isolated from the *Rauwolfia serpentina*, has been around since the 1950s. This compound, used for hypertension treatment, had undesirable side effects in patients. The most notable side effect of inducing depression. Reserpine's action is that it binds irreversibly to the VMAT2 receptor on biogenic amine storage vesicles. This, in turn, causes the storage vesicles to leak their contents into the neuronal cytosol. Cytosolic enzymes such as Monoamine Oxidases then, in turn, catabolize neurotransmitters, namely Serotonin (5-HT), Dopamine (DA), and Norepinephrine (NE). The depletion of these biogenic amines leads to an increase in depressive-like behavior in various rodents. In addition to inducing a depressive state, traits associated with pain were also observed in rodent models. Pain is an important characteristic that is comorbid in patients with major depressive disorder, often referred to as the pain-depression dyad. The extent of the induced-depressive state can be determined based on several proven tests such as the forced swimming test, open field test, and von Frey Hair test. Reserpine also induced visible and empirical changes in rodent behavior such as akinesia, ptosis, and hypothermia to name a few. Current research utilizing Reserpine ranging from drug discovery to pathogenesis of diseases such as fibromyalgia are also summarized. Reserpine shows efficacy as a suitable model of depression in rodents to further the study of this dis

Mathematics and Science.Biology.02

DariaReynolds, ThyHa, MonaEasterling

Tulsa Community College

A STUDY OF PUBLICLY ACCESSIBLE DATA REGARDING CHRONIC OBSTRUCTIVE PULMONARY DISEASE AMONG ADULTS IN TULSA, OKLAHOMA

Almost 15.7 million Americans report a Chronic Obstructive Pulmonary Disease (COPD) diagnosis, but more than half of US adults with low pulmonary function report they have not be diagnosed with COPD. 80% of COPD deaths are attributable to smoking. The use of publicly accessible data provides an opportunity to compare the number of self-reported smokers in our city to the number of individuals who report being diagnosed with COPD. The 500 Cities Project has incorporated multilevel regression and poststratification to link geocoded health surveys to produce local level health related estimates. The purpose of this project is to compare the percentage of adult smokers to the percentage of adults diagnosed with COPD using the 500 Cites Project data within Tulsa County.

Mathematics and Science.Biology.03

MarlyFixico-Hardison

Oklahoma State University

Temperature variance in Thailand: The relationship with free-ranging small subtropical mammals with ambient temperature

In the face of a rapidly changing climate, the ability to make informed decisions about how certain groups (plants vs. animals) or certain communities (tropical low elevation vs. tropical high elevation) might respond is a pressing problem for organismal biologists (Janzen 1967).

This study results from a Research Experience for Undergraduates (REU) that took place in northeastern Thailand in the summer of 2018. The goal of the study was to compare data from Thailand's subtropical regions, where there is a minimal variation of temperature, to regions with temperate conditions. By doing this, we hope to understand small mammal populations' physiological response to fluctuating temperatures. Data was collected at the Maha Sarakham University forest in Koeng, Muang Mahasarakham, Maha Sarakham. Methods included identifying trapping locations and food preference, performing respirometry tests on small mammals captured, measuring site temperatures, and then releasing mammals at the captured site. With the use of iButtons and secondary temperature recordings, we were able to show a variance in the temperature of the small mammal's environment. However, due to a low sample count of small mammals we were unable to determine the populations' physiological response to fluctuating temperatures.

Mathematics and Science.Biology.04

CorbinWalters, IanFladie, AngelaClifton

Oklahoma State University

Is the Research you Value a Waste of Money?

Objective and Hypothesis:

Eighty-five percent of health research may be wasted, resulting in \$170 billion annually in wasteful research spending worldwide. Given the increased use of randomized trials and their influence on medicine, one method to combat research waste is to conduct RCTs only when a systematic review (SR) suggests more data are needed or when no previous systematic reviews are identified. We hypothesize SRs would be rarely cited as justification for conducting RCTs.

Methods:

We analysed RCTs published between 2016 and 2018 in New England Journal of Medicine, Lancet, and Journal of the American Medical Association. We performed duplicate and independent data extraction to ensure the accuracy and validity of our data. For each trial, we extracted whether SRs were cited as justification for conducting the clinical trial.

Results:

Our search retrieved 665 records, of which 628 were included. Overall, 706 SRs were cited in these 628 RCTs; of which, 318 were referenced in the introduction, 82 in the methods, and 306 in the discussion. 49 SRs were cited verbatim as justification for conducting the trial.

Summary:

Very few clinical trials cite systematic reviews as the basis for undertaking the trial. We believe trialists should be required to present relevant systematic reviews to an ethics or peer review committee demonstrating an unmet need prior to initiating a trial. Eliminating research waste is both a scientific and ethical responsibility.

Mathematics and Science.Biology.05

MyshalMorris

Langston University

Identifying New EGFR Driver Mutations in Non-Small Cell Lung Cancer

Lung cancer is the leading cause of cancer deaths worldwide, with a 5-year survival rate of 18%. Non-Small Cell Lung Cancer (NSCLC) represents the major histological sub-type making up 85% of all lung cancers. One oncogenic driver of NSCLC is EGFR, which is mutated in 14% of patients. Currently, a subset of EGFR mutations remains functionally uncharacterized. In this study, we sought to functionally characterize all possible EGFR mutations. To systematically assess uncharacterized mutations in EGFR, we performed a saturation mutagenesis screen, where we identified both known EGFR hotspot mutations (EGFR L858R) and potential novel EGFR driver mutations. From our screening efforts we identified EGFR I759M as a potential novel driver of EGFR oncogenesis. To validate this finding, we expressed EGFR I759M in H3122, a NSCLC cell line, and performed a population doubling assay and a cell viability assay. We also evaluated EGFR I759M protein expression using western blot analysis. Together, our preliminary findings suggest that the EGFR I759M mutation is a likely driver of EGFR oncogenesis.

The Bacterial Cell Wall: Localizing enzymes required for peptidoglycan synthesis in the presence of β -lactam antibiotics

Bacteria are surrounded by a peptidoglycan (PG) cell wall that protects them from lysis due to turgor pressure. β -lactam antibiotics work by inactivating penicillin-binding proteins (PBPs) that synthesize the cell wall. E.coli has four PBPs. One of these is essential for elongation (PBP2) and another for division (PBP3), but the roles of PBP1a and PBP1b are unclear. Previously, the Weiss lab observed that a GFP-PBP1b fusion protein accumulated at division sites when PBP3 was inactivated with the β -lactam cephalexin. This finding suggests PBP1b might be a repair enzyme that localizes to sites where the cell wall is damaged. Here we artificially produced three foreign PBPs from *Pseudomonas* and *Vibrio* in *E. coli*. Two of the foreign PBPs localized to division sites when cells were treated with cephalexin. These foreign PBPs are only 21-38% identical in amino acid sequence to *E. coli* PBP1b. That makes the foreign PBPs too diverged to interact productively with any *E. coli* proteins. In contrast, the structure of PG is highly conserved among these bacteria. We conclude that septal localization of the PBPs is likely driven by recognition of some form of damaged or aberrant PG, with the intent to repair it.

AustinJorski

Other

Global Health Uganda 2018: Where are we now?

Introduction – OSU-COM students and physicians have been traveling to Sister Rosemary’s in Gulu, Uganda to both learn about and assist in Ugandan healthcare since 2015. There have been many positive changes on Sister Rosemary’s compound with the addition of a birthing center and expansion of the health care clinic throughout the years. These additions have improved access to health care in Gulu and surrounding towns. We set out to analyze the current prevalence of disease and demographics in Gulu and Atiak in order to better understand and help the Ugandan people. Our research allows for tailoring of future health care education programs and distribution of research on future trips.

Methods – Data collection occurred through a standardized SOAP note created prior to departure to insure accurate data collection. All statistical analysis was done using excel.

Results – Our team saw roughly 450 patients and our data demonstrates that among the most prevalent disorders treated were gastroesophageal reflux disease, musculoskeletal pain, parasitosis, and upper respiratory infections.

Conclusion – This information allows us to be better prepared on future trips with proper medications and resources to best aid the Ugandan people. Future research topics to investigate would be to analyze the progression of disease throughout the years at Sister Rosemary’s and other locations affiliated with the global health program.

Mathematics and Science.Biology.08

EliviaLayton, SheylaRabei

University of Central Oklahoma

Nano-Graphene Oxide for Drug Delivery and Phototherapy

Laser immunotherapy (LIT) was developed as an alternative to traditional cancer treatment options because it targets both the primary tumors and metastases. Single-walled carbon nanotubes (SWNTs) have been used as a photosensitizing agent and drug delivery system; however, SWNTs may accumulate in the lungs and potentially in other organs. A search is underway for a nanoparticle that works both as a photosensitizer and a drug delivery vehicle and, more importantly, can also be expelled from the body safely. This study tests nano-graphene oxide (nGO) sheets used as a photosensitizing agent. The GO sheets were also synthesized with imiquimod, a known immunoadjuvant. Our results indicate that nano-graphene oxide, when functionalized with appropriate immunoadjuvant as well as other therapeutic agents, could be a useful tool in laser immunotherapy.

Mathematics and Science.Biology.09

SanaMesiya

University of Central Oklahoma

Subcellular Localization of Gold Nanorods in Cancerous Cells

Gold nanorods (GNRs) have the potential for cancer treatment as tumor-targeting photosensitizers due to their strong absorption of near-infrared light. The purpose of this project is to study the subcellular localization of GNRs in cancerous cells to optimize cancer treatment using irradiation at appropriate wavelength.

Subcellular localization of gold nanorods has been shown to have a significant impact on the viability and morphology of cancer cells as well as retention or exclusion of GNRs.

Our goal is to gain a comprehensive understanding of native and functionalized GNRs in order to develop safe and effective clinical applications for gold nanorods in laser treatment of cancers.

Mathematics and Science.Biology.10

SaraZukerman

University of Central Oklahoma

Laser-induced cellular effects of ICG and (R)-9bMS for cancer treatment

Metastases are the leading cause of cancer-related deaths. Common treatment methods of cancer- including chemotherapy, surgery, and radiation- often fail to effectively target and control metastases. Laser immunotherapy (LIT) used in tandem with a photosensitizer is a possible alternative that was developed with the idea of using the host's immune system to help attack both the primary tumors and metastases in order to develop long-term, cancer-resistant immunity. Studies using (R)-9bMS, a small molecule inhibitor, have shown that it significantly compromises cancer cell proliferation in triple-negative breast cancer cell lines. In this project, indocyanine green (ICG) and (R)-9bMS are combined to study photo effects using 4T1 breast cancer cells. The effects of (R)-9bMS and ICG on cell viability and migration were observed and analyzed. These results prove (R)-9bMS could be a useful addition to LIT when used on triple-negative breast cancer.

TheresaStein, SkylerMills

Southwestern Oklahoma State University

The effects of stream order, season, and drainage on the abundance of two caddisfly families

Rivers are constantly flowing and vary in different locations. Therefore, one area of a river or stream may differ from another in abundance of organisms. However, streams remain connected, as changes upstream may affect areas downstream. We hypothesized that stream order, season, and drainage would affect the abundance of two caddisfly families (Leptoceridae and Hydroptilidae). Species within each of these families have been identified as species of conservation concern by the Oklahoma Department of Wildlife and Conservation. We collected adult caddisflies in the Kiamichi River, Little River, and Spring Creek drainages using manned and unmanned light traps. Samples were collected during both spring and summer months. For both families, we found no difference in abundance between seasons or among drainages. We found that the abundance of leptocerids was significantly higher in third order streams than first or second order streams. However, stream order did not have a significant effect on hydroptilid abundance. We conclude that stream order affects the abundance of Leptoceridae in eastern Oklahoma streams. This information can be used to optimize sampling effort to detect species of conservation concern in this family of caddisflies.

Mathematics and Science.Biology.12

HopeOgbeide, MaryTappert

University of Central Oklahoma

DEVELOPMENT OF A MICROFLUIDIC IMMUNOLOGICAL ASSAY FOR THE DETECTION AND IDENTIFICATION OF STAPHYLOCCOUS AUREUS ENTEROTOXIN IN FOOD SAMPLES

This study describes the development and testing of a microfluidic immunological assay that combines lateral flow assay and microfluidic paper-based analytical device designs for the purpose of detecting and identifying enterotoxins from *Staphylococcus aureus* in contaminated foodstuffs. Initial design research was done using BSA and anti-BSA to mimic the actual target antibody/antigens. The final assay design will use culture supernatant from enterotoxin-producing *S. aureus* as antigen and commercially produced antibodies, with antigen-antibody binding detected by a fluorophore- or gold nanoparticle-labeled secondary antibody. We described the stepwise optimization of antigen binding, antibody flow, and complex detection in a microfluidic system.

MakaylaMcGuire

University of Central Oklahoma

Extracts From Sea Sponges Inhibit Fibroblast Migration

Fibroblasts are the primary connective tissues present in the body and 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. The fibroblasts were plated with an elastomer plug 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. 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 treatment option.

Mathematics and Science.Biology.14

Daniel Marshall

University of Central Oklahoma

Predation Preference of *Toxorhynchites rutilus septentrionalis* on Two North American Encephalitic Arbovirus Vectors

Larvae of *Toxorhynchites* (Diptera: Culicidae) prey on mosquito larvae, reducing vector species populations. Adults feed on nectar and are incapable of transmitting human pathogens. Little research has focused on *Toxorhynchites rutilus septentrionalis* and its use as a biocontrol.

The goal of this project is to determine if *T. r. septentrionalis* exhibits a feeding preference between *Aedes aegypti* and *Culex quinquefasciatus*. Fourth instar *T. r. septentrionalis* will be presented with third instar prey larvae of both species and mortality will be observed. Manly's alpha will be used to obtain probability of mortality for each species given the prey species population composition. Deployments of predatory larvae will take place at Arcadia Lake, Edmond, OK to determine if the laboratory model holds true in the field. Mosquito survey data from 2018 and 2019 will be used as a control to determine if mosquito species composition is altered by the introduction of *T. r. septentrionalis*.

Glycated Chitosan Derivatives Inhibit Myofibroblast Form and Function In Vitro

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; our goal was to expand those results to include other DC cell lines and determine whether single-walled carbon nanotube-conjugated GC (SWNT-GC) would be similarly effective. 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. Proliferative myofibroblasts were identified by the presence of alpha smooth muscle actin via immunofluorescent staining. Compared to control conditions there were fewer myofibroblasts in GC and SWNT-GC treatments but without a significant decrease in the number of nonproliferative fibroblasts. This suggests GC and SWNT-GC may be a possible treatment for the recurrent problem of fibrotic diseases by inhibiting fibroblast compaction and myofibroblast phenotypes.

Testing The Effects of Branched Poly(ethylenimine) and Ampicillin on Methicillin-resistant *Staphylococcus aureus* Biofilms

Methicillin-resistant *Staphylococcus aureus*, or MRSA, is a difficult to treat infection of both medical implants and wounds. This type of *S. aureus* is characterized by its resistance to beta-lactam antibiotics or those antibiotics that are derivatives of penicillin. The bacteria have an altered protein, PBP2a which is a mutated form of PBP that non-resistant strains use. MRSA strains can easily form biofilms compounding the effects of clinical treatment. They first create a physical barrier to prevent antibiotics from reaching the bacteria. The bacteria within the biofilms also have switched to a non-dividing nature or solitary lifestyle, most antibiotics only work effectively against actively dividing bacteria. Branched poly(ethylenimine), or BPEI, has shown to re-sensitize MRSA to the beta-lactam antibiotics. This occurs by targeting teichoic acid, a molecule PBP2a needs to properly function, leaving it vulnerable to beta-lactam targeting. Using a checkerboard assay, high molecular weight BPEI was tested for any synergistic antibiofilm effect when combined with ampicillin against MRSA biofilms. Results show that at a combination of 128 ug/ml of both BPEI and ampicillin results in a reduction in biomass. ANOVA testing indicates that BPEI and ampicillin individually have a significant effect on the biomass reduction of the biofilms but together are not significant. These results indicate further replicate trials are needed to further investigate the relationship between BPEI

Mathematics and Science.Biology.17

JustinHarris, AlishaHoward, JefferyLiu

East Central University

Identifying Species Divergence in the Endemic Caecidotea Cave Populations

The Arbuckle karst system consists of caves, microfractures, and hydrogeologic barriers. Isopods in the genus *Caecidotea* inhabit the pools of water within the caves of the system. Young *Caecidoteas* travel through microfractures, and small populations move from one cave system to the next. Over the time these fractures close, causing the populations of *Caecidotea* to be isolated and potentially drift genetically. The sampled distinct populations have become morphologically distinct, but it is yet to be determined if they also have become genetically distinct species. DNA Barcoding using the Cytochrome Oxidase subunit 1 (COX1) gene will provide the percent of divergence in the samples obtained from different populations/locations. Successful DNA extraction is a pivotal part in this technique. A major obstacle addressed involves obtaining a high enough yield of DNA from the isopoda exoskeleton while keeping the extract clean from protein contamination. To address this, our lab has employed a variety of extraction procedures to optimize our DNA barcoding effort.

Mathematics and Science.Biology.18

ConstanceGreen

East Central University

Finding Novel Antibiotic Producing Bacteria

The demand for new antibiotics is extremely high due to an increase in antibiotic-resistant bacteria. This is causing common infections to become untreatable. The problem of antibiotic resistant bacteria is exacerbated by the thirty year gap in antibiotic discovery. Antibiotics are naturally occurring chemicals secreted from bacteria or fungi that kill other microbes. Thus, antibiotic producing bacteria are typically found in locations with high levels of competition with other microbes, such as the soil. Our goal is to use soil samples to find bacteria that produce previously unknown antibiotics in the hopes of postponing a post-antibiotic era.

Colleen (Denver)La Force, ChristinaBourne

Oklahoma State University

Cloning and expression of Chlamydia trachomatis inclusion membrane proteins

Chlamydia trachomatis is an obligate intracellular human pathogen that resides inside host cells within a vacuole called an inclusion. To replicate & grow Chlamydia must usurp host cell proteins from within this vacuole. To do this, Chlamydia produce & secrete proteins, termed inclusion membrane proteins (Incs), that insert in the inclusion membrane with the N- and C- terminus facing the host cytosol. C. trachomatis is predicted to have 50 Incs, however few of these have known functions. Little knowledge about their function is gained via bioinformatics analysis as they lack similarity to any proteins outside of Chlamydia. This makes characterizing Incs or identifying possible functions difficult. The goal of this project is to clone & express the C-terminus of certain Incs which will be used to produce purified protein for future crystallography studies. This study focuses on the CT229-CT224 operon which is only found in human pathogens. Here, we present the cloning strategy of an Inc into the expression plasmid pET28a which will generate a C-terminus Inc fusion to a 6X His tag. To date CT226, CT227 & CT228 have been successfully cloned, verified by sequencing and transformed into BL21 for expression studies. Once the Inc proteins are produced they will be prepared for crystallography. By assessing the structures, insights may be gained as to possible functions based on similarity to other characterized proteins

Mathematics and Science.Biology.20

JessicaVallejo, NikkiMorgan, JessicaVallejo, DianaSpencer

Tulsa Community College

Optimization of the DNA Barcoding Protocol and the Evolutionary History of Botanic Garden Plants

DNA barcoding uses the sequences of a small section of DNA that is universally present and sufficiently varied to identify cryptic species, discover species, revise taxonomic schemes, and unravel food webs. The use of *rbcl*a and *matK* genes provides a method to test for species richness with genes that are sufficiently differentiated and universal. The aims of the study included: i) verification of identification of plants collected from the Tulsa Botanic Garden; ii) lab process analysis using two DNA extraction methods; iii) and evaluation of phylogenetic divergence using freely available software. DNA was extracted from the plant tissue using two methods, and the two genes were amplified using published primers and spectrophotometric data. Products were verified by fragment size on an agarose gel with a molecular mass ruler. Amplicons were purified using a spin column, diluted, and sent for sequencing. Freely available software tools were used for phylogenetic analysis. Sequencing showed a 29% success rate of amplicon production. Three out of twelve samples were positive for both *matK* and *rbcl*a identification, one sample was positive for only *rbcl*a identification. Twenty-five percent of our positive specimens had a 260/230 ratio less than 0.40. Fifty percent of our successful samples used less than the recommended 0.25ug of DNA for each 25ul reaction. There was no clear divergence between Angiosperm and non-flowering plants.

Lilian Chooback, Alan Nguyen

University of Central Oklahoma

Searching for Dihydrodipicolinate Synthase Inhibitors as a Possible Antibiotic

Dihydrodipicolinate Synthase (DHDPS) is the enzyme that catalyzes the first step in the lysine biosynthetic pathway. Lysine is an essential amino acid in humans and should be obtained through diet. Enzyme catalysis is initiated through binding of the first substrate, pyruvate, to the active site of DHDPS. The binding of the second substrate, ASA, is believed to form 2, 3-dihydrodipicolinate. Finding a tight-binding inhibitor for DHDPS in the lysine biosynthetic pathway will generate a compound which is a candidate for antibacterial drug design.

Kinetic studies of DHDPS and the inhibitor of the enzyme 2-bromopropionic acid showed that 2-bromopropionic acid is the competitive inhibitor of the enzyme versus pyruvate. Inhibition constant was determined to be 8.3 ± 0.8 mM. Crystals of DHDPS in complex with 2-bromopropionic acid are formed at pH 7.5 in the presence of 8 mM 2-bromopropionate, ~20% PEG 3350, 10 mM spermidine, 200 mM sodium tartrate, and 5.5 mg/mL DHDPS. Bacterial culture viability experiments indicate that 2-bromopropionic acid inhibits the growth of *Escherichia coli* harboring DapA gene by 90%.

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Chlamydia trachomatis Inclusion Membrane Protein CTL0478 Interaction with Flightless I Homolog

Chlamydia trachomatis causes a range of infections such as blinding trachoma and urogenital infections leading to serious complications. Inside the host cells, it lives in a parasitophorous vacuole called inclusion and secretes various effectors to manipulate host's cellular processes. CTL0478 is an inclusion membrane protein (Inc) shown to co-purify with flightless I homolog (FLII) in a global Inc-human interactome study. FLII is known to regulate inflammation pathways. This study aims to characterize CTL0478-FLII interaction. In silico analysis of CTL0478 revealed a leucine zipper (LZ) within coiled coil in the C-terminal. Coiled coil is also found in host proteins interacting with FLII. *C. muridarum* contains a CTL0478 homolog with conserved leucine residues in LZ. FLII recruitment to *C. trachomatis* L2 inclusion was confirmed by immunofluorescence. FLII recruitment was also seen in *C. trachomatis* serovar B and *C. muridarum* suggesting an overall conserved mechanism. HeLa cell line expressing CTL0478-GFP was generated for use in directed pull-down assays. Further, CTL0478 was cloned into chlamydial shuttle vector pBOMB-tet-mCherry which will be used to generate *C. trachomatis* L2 expressing flag tagged CTL0478 for co-localization and pull down assays.

Mathematics and Science.Biology.23

McKaylaMuse, KayleyPate

University of Central Oklahoma

Analysis of Proliferation and Migration in Phenylalanine, Retinoic Acid, and 4-diethylaminobenzaldehyde Treated Cells

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], and 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. Our lab has preliminary evidence that high levels of Phe could inhibit Retinoic Acid [RA] signaling, which typically promotes the expression of genes such as 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 migration and proliferation, which may contribute to the defects seen in MPKU. We also looked at the effects of exposure to RA and 4-diethylaminobenzaldehyde [DEAB], a known RA inhibitor. We conducted in-vitro proliferation and migration assays on several cell types to determine if proliferation and migration was affected by Phe, RA, and DEAB exposure. Images were analyzed with ImageJ and GraphPad Prism. Present research suggests that Phe exposure causes a significant decrease in proliferation of cells. It is also shown that RA increases or does not affect proliferation, and that DEAB decreases cell proliferation. In this way, Phe is similar to DEAB, which suggests that it also acts as an RA inhibitor. This could contribute to the CVMs observed in MPKU. The results of mi

JonathanDerouen

Oklahoma State University

Protein Kinase A Manipulation by *Chlamydia trachomatis* During Infection

The most commonly reported bacterial sexually transmitted infection in the United States is *Chlamydia trachomatis* which can lead to pelvic inflammatory disease, tubal infertility and even increased risk of cervical cancer. *C. trachomatis* is an obligate intracellular pathogen that lives in a parasitophorous vacuole. After infection, manipulation of different host proteins, including host kinases, aid in intracellular development and survival of *C. trachomatis*. However, not much is known about the mechanisms utilized by *Chlamydia* to manipulate host cellular kinases such as Protein Kinase A (PKA). PKA plays a key role in regulation of several cellular processes and is known to be manipulated by another obligate intracellular pathogen, *Coxiella burnetii*, which has a similar developmental cycle. We hypothesize that *C. trachomatis* manipulates PKA for intracellular development inside the host. Western blot analysis of lysates of *C. trachomatis* infected HeLa cells for PKA substrates showed increased phosphorylation during infection. Specific substrates of PKA also showed increased phosphorylation while the total PKA levels were similar across different time points of infection. These findings suggest that PKA is activated during *C. trachomatis* infection and may be integral to the infection process.

DeepaliLuthra

Oklahoma State University

Determining the Role of Ca^{2+} and Ca^{2+} -binding Protein EfhP in Adherence of *Pseudomonas aeruginosa* to Lung Epithelial Cells.

Pseudomonas aeruginosa is an opportunistic human pathogen, responsible for severe acute and chronic infections. It is one of the primary organisms that form biofilms on airway mucosal epithelium in the lungs of patients with cystic fibrosis (CF). Ca^{2+} accumulates in pulmonary fluids of CF patients and regulates hyperinflammatory host response to bacterial infections. Studies show that Ca^{2+} binds directly to the Ca^{2+} -binding protein EfhP of *P. aeruginosa* and elevated Ca^{2+} leads to increased virulence in *P. aeruginosa*, but little is known about how Ca^{2+} regulates *P. aeruginosa* virulence during infection of human cell lines. The goal of this study is to determine how Ca^{2+} affects initial adherence of *P. aeruginosa* and the role of Ca^{2+} -binding protein, EfhP in this host-pathogen interaction. The adherence of *P. aeruginosa* was determined with the wild-type strain PAO1, PAO1043 (efhP deletion mutant) and PAO1043.pMF (complemented strain expressing EfhP) utilizing human lung epithelial cell lines (A549) in low and high Ca^{2+} conditions using RPMI. It was estimated that RPMI contains approximately 0.5-0.67 mM Ca^{2+} , which is spiked to 5mM to obtain the high Ca^{2+} condition for the assays. Adherence studies show that there is no significant difference in percentage adherence of all the three strains when compared amongst low and high Ca^{2+} conditions. Thus, EfhP doesn't seem to play a role in adherence of PAO1 with A549 cells.

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

Introduction: Basic terminal hydroxyl groups of a pure titanium surface react with tresyl chloride, which allows for further coupling with fibronectin.[1] Previous in vivo studies using a rabbit femur model found that immobilizing fibronectin onto cylindrical pure titanium implants enhanced bone regeneration around implants.[2] 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 [3]). 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.

RandiReyes, JimenaAracena

Southwestern Oklahoma State University

Foraging Behavior of Fruit Flies (*Drosophila melanogaster*) on Sugar Patches in 3-D

Fruit flies (*Drosophila melanogaster*) are an excellent model organism to study the neural basis of behavior. An important function of the central nervous system is to process conflicting information and produce a response that increases the probability of survival of the animal. This decision making process can be studied on fruit flies feeding on patches of sugar in the laboratory. We present here preliminary results and a proposal to study the effect of gravity and orientation on foraging choices of flies in a three-dimensional setting. The ability of fruit flies to walk on vertical and inverted surfaces allows them to forage for food on inverted patches and on vertically placed patches at various angles of inclination. Our preliminary tests show that the flies feed at the same rate when foraging on two food patches facing up (67% feeding) as on two patches facing down (70%). When one patch faces up and the other faces down, only 44% of the flies feed. However, in all cases tested, the flies prefer the higher concentration of sugar, regardless of patch orientation. This suggests that patch orientation affects the locomotion aspect of foraging but not the feeding decision once the patch is located. To further test this hypothesis, we plan to use food patches that are spherically shaped, patches oriented vertically, and patches on a sloped diagonal plane.

CaylieHolybee

Cameron University

EVOLUTIONARY RELATIONSHIPS AMONG SUBSPECIES OF THE EASTERN MOLE (*SCALOPUS AQUATICUS*) IN THE CENTRAL UNITED STATES

Scalopus aquaticus, commonly known as the eastern mole, is native to the eastern U.S. with populations extending into southern Canada and northern Mexico. Yates and Schmidly (1977) used morphometrics to study individuals from the central U.S., and Hall (1981) reported that 16 subspecies were recognized at the time. Here, we used cytochrome b sequence data to evaluate the genetic differences of 7 *S. aquaticus* subspecies to examine if geographical barriers within the central U.S. affect the gene flow of this species. We sequenced 465 base pairs of the cytochrome b gene from 36 museum specimens collected throughout the central U.S. Both neighbor joining and maximum likelihood methods, following a Tamura3 + G model of evolution and 1,000 bootstrap replicates, suggest there is genetic support for only 2 of these 7 *S. aquaticus* subspecies. Two specimens from Louisiana form a separate group from all other specimens in the central U.S. The validity of the subspecies in Louisiana, *S. aquaticus howelli*, was also supported with an average genetic distance of 5.8% when compared to any other specimen. Pairwise genetic distances between all other moles averaged 2.3%. Our results, using cytochrome b DNA sequences, are similar to those of a previous unpublished student thesis using D loop sequences. Together these studies suggest high levels of gene flow among moles throughout the central U.S. and call into question the taxonomic status of many *S. aquaticus* subspecies.

Greyson Weedon, Zach Jones

Southwestern Oklahoma State University

Botteri's Sparrow Density Changes With Spreading Non-native Habitat in Southeastern Arizona

The Botteri's Sparrow (*Aimophila botterii*) is a bird of tall grasslands that temporarily disappeared from Arizona following heavy livestock grazing in the 1890s. Its return was noted first in sacaton (*Sporobolus wrightii*), an uncommon native floodplain tallgrass often >2 m in height, and subsequently in stands of exotic lovegrasses (*Eragrostis* spp.) spreading into adjacent uplands that otherwise supported shorter native grasslands. From 1999-2001, 18, 10-ha plots (six each of sacaton, exotic, and native upland habitats) were sampled for Botteri's Sparrow density and vegetative characteristics and demonstrated that exotic grasslands were providing suitable breeding habitat, not functioning as an ecological trap. At that time, territorial density was positively associated with grass height and cover, being greatest in sacaton, intermediate in exotic, and lowest in native upland grasslands (8.5, 5.5, 4.3 territories/plot, respectively). The goal of the proposed work is to measure both the vegetation characteristics and territorial densities on the same plots that were sampled 20 years ago with the expectation that the spread of exotic lovegrasses has continued, now covers a larger proportion of the shorter native grassland plots, and concomitantly supports relatively higher densities of Botteri's Sparrows on those plots than before.

Mathematics and Science.Biology.31

AliciahWalker

University of Central Oklahoma

Examination of genetic structure in Mediterranean Geckos (*Hemidactylus turcicus*) at the University of Oklahoma South Oval

Mediterranean Geckos are an exotic species that are excellent for studying evolutionary mechanisms. They spread around the world by using the ability to adapt to human architecture. Once geckos are established, the population expands slowly. Our goal is to better understand processes limiting gene flow between groups that are relatively close to each other but that have diverged across short time spans, with collecting at least 20 geckos per building. We started sampling the invasion of geckos at the University of Oklahoma (OU), which was first colonized in the 1940s or 1950s by escapees from one of two buildings: Richard Hall or a laboratory near the current Clock Tower. We have surveyed fifteen buildings in the South Oval of the campus and found two buildings that do not have geckos. So far, we have collected over 124 samples from South Oval. We expect to see low genetic diversity and multiple genetic clusters compared to findings from other locations. The data collected from OU will be compared to UCO and the Oklahoma City Zoo, three independent colonizations with similar environmental conditions.

Emily Bedea

Southwestern Oklahoma State University

In-silico analysis and homology modeling of α -carbonic anhydrase from *Streptococcus sanguinis*, an opportunistic pathogen involved in subacute infective endocarditis

Streptococcus sanguinis is one of the leading causes of infective endocarditis (IE) in a susceptible population. Although several virulence factors involved in IE have been identified, the exact mechanism by which *S. sanguinis* colonizes endocardium remains unclear. In addition to some well-characterized virulence factors, *S. sanguinis* also contains virulence-associated proteins that are not well characterized. One such protein that is associated with virulence is carbonic anhydrase (CA) that catalyzes the reversible hydration of CO₂ to bicarbonate. The goal of this study is to identify and characterize carbonic anhydrase from *S. sanguinis*.

We have identified a α -CA from *S. sanguinis* (SsCanB) using BLAST analysis that shows high homology to other well-studied α -carbonic anhydrases. SsCanB is an 18.2 kDa protein with no N-terminal signal peptide indicating its cytoplasmic localization. Sequence alignment of *S. sanguinis* with closely related homologs shows conserved domains typical of α -CA including residues important for metal coordination and protein-protein interactions. Homology modeling and subsequent structure analysis of SsCanB reveals that both proteins have α -fold typical of α -CA's. Analysis of the active site of SsCanB shows conserved residues involved in zinc ion coordination similar to other well-studied α -CA's. Furthermore, the catalytic dyad (Asp/Arg) required for the activation of water molecule coordinated with

Mathematics and Science.Biology.33

KaitlynHickey

University of Central Oklahoma

Using Mitochondrial DNA to Create a Wildlife Genetic Database

The “Using Mitochondrial DNA to Create a Wildlife Genetic Database” research project is interdisciplinary between forensic science and wildlife biology. Samples of various animal tissues were taken from the Oklahoma City Zoo in groups of ten based on importance to the Zoo. The samples are stored at the University of Central Oklahoma and individually put through the process of DNA extraction, purification of mitochondrial DNA, and PCR. The samples are then genetically sequenced and a genetic profile created. The goal of the project is to have enough samples from different exotic, endangered, and protected animals to create a DNA database where samples of new genetic profiles or profiles already produced, whether species is known or not, can be submitted and compared to the known genetic profiles. Being able to identify species from a genetic profile would be very useful for criminal cases involving said animals. Having a database with known genetic profiles from many different species could give more certainty to these criminal cases and result in better outcomes.

Cytoskeleton changes induced in Dupuytren's contracture cells by phenformin

Dupuytren's contracture is a disease caused by formation of connective tissue in the dermis that will affect the movement of fingers. Myofibroblasts participate in wound healing and excessive scarring in patients with Dupuytren's contracture and other fibrotic diseases. According to prior research, Myofibroblasts are characterized by an abundance of alpha smooth muscle actin (αSMA) within stress fibers in the cytoplasm of the cell. We proposed a research to find out how the cytoskeleton in the Dupuytren's contracture (DC) change when it's introduced with Phenformin. Therefore, we predicted that when DC cells are exposed to Phenformin, DC cells stop the migration process but still undergoing proliferation. So, we wanted to find a visual evidence of what we predicted. This study is mainly used to examine the differentiation and proliferation that phenformin has on DC cells. Through scientific analysis of the data from OCT, image J and fluorescence microscopy, the group treated with phenformin demonstrated suppression of myofibroblast differentiation and had no changes in cell proliferation. Our result showed a slight reduce in lattices height using OCT and decrease in alpha smooth actin muscle via click-EdU staining assay. Therefore, Phenformin has the potential to treat Dupuytren's contracture (DC) by inhibiting the differentiation and proliferation of myofibroblasts. Our future goal is to run more myofibroblast-appropriate functional bioassays

JohnBarthell

University of Central Oklahoma

Foraging Patterns of Three Carpenter Bee Species at Chasteberry Bushes in an Aegean Island Ecosystem

We recorded foraging times of three species of carpenter bees at chasteberry bushes on the Northeast Aegean island of Lesbos (Greece). These records were made at 30-minute intervals over a 14-hour period (before sunrise and after sunset). In a sister study, we observed activity patterns of the same bee species in order to elucidate any corresponding circadian rhythms. The largest bodied of the three bee species was most frequently observed during the earlier and later periods of the day while the smallest bodied species was more common during the middle of the day. The third species (mid-sized) was crepuscular in its habits. Ecological and genetic factors may both contribute to these differences in foraging times and larger bodied species may have a physiological advantage during cooler periods of the day (given their reduced ability to radiate heat) while smaller bodied species may better forage during the hottest times of day. Subsequent studies of the thermotolerance of these species are consistent with this conclusion; the crepuscular species may have more limited ranges of time for foraging than the other two species. This study system has application to broader questions concerning foraging dynamics of pollinator species within plant communities across ecosystems.

KyraGallagher, WeiChen

University of Central Oklahoma

An exploration of the potential role of the synthesis between low-density lipoproteins and reduced graphene oxide in laser immunotherapy cancer treatment

Laser immunotherapy (LIT) is a cancer treatment modality which utilizes a photosensitizer and an immunoadjuvant to spark an immune response after lasing the primary tumor, which then allows for the destruction of metastases around the body. It is possible that the materials on which LIT relies could be transported to cancerous cells via the use of low-density lipoproteins (LDL), which occur naturally in mammals. This delivery method makes use of the overexpression of LDL receptors (LDLR) by cancer lines. This increased uptake will be confirmed via western blot. Previously documented effects of reduced graphene oxide (rGO) suggest its useful nature in LIT, rendering it a prime candidate for integration into an LDL nanoparticle. This study will perform assays on a synthesis between these two materials, dubbed rGO-LDL, to assess its impact in cells and under laser conditions. Tests will include an investigation of rGO-LDL uptake in healthy and infected cells, toxicity, and migration inhibition, repeated both with and without laser treatment.

CONSTRUCTION OF A MICROBACTERIOPHAGE LYSOGEN

Bacteriophages are viruses that infect and replicate in a bacterial host cell. The Oklahoma soil due to its diversity is a good source for finding new bacteriophages. Due to the emergence of drug-resistant bacteria, there is an increasing need for isolating new phages that can be used for phage therapy. In my research, I have purified and sequenced three bacteriophages from Oklahoma soil. These bacteriophages were previously isolated by Virology students at the University of Central Oklahoma. The soil phages were isolated using *Microbacterium foliorum* as the host bacteria. I hypothesize that we will be able to find a lysogen for one of the three phages. A lysogen is a host bacterium cell that contains a stably integrated copy of a phage genome. This research began with the purification of each phage sample, followed by amplification to obtain purified phage lysates. Viral genomic DNA was extracted from each of the three samples. Phage genomes were characterized using restriction digest with *HaeIII*, *NspI*, and *SacII*. Phages Arroyo and Busephilis have been sequenced using Illumina sequencing technology. Phages Arroyo and Busephilis are newly discovered bacteriophages from Oklahoma soil with a genome length of 42129 and 52986 bp respectively. I have successfully created a lysogen for Phage Sasian. The purified lysogen can be used to test the ability of other phages to infect the new lysogen. The results from this study expand the knowledge of host immunity to phage infection.

OswahCheema

University of Central Oklahoma

Quantifying Diffusion Coefficient of Flagella-driven Cellular Motility

Cilia and flagella play a very important role in maintaining the human body to function properly. Dysfunctioning of cilia impairs the functioning of many human systems, examples include heart, brain, and respiratory system. Though biology of cilia has been under research for a long time, biophysical properties of them are not yet clear. The structure of green algae *Chlamydomonas* flagella is very similar to human cilia. The viscosity of medium *Chlamydomonas* are cultured do affect their cellular diffusion and the movement of their flagella. To test it, light scattering based particle imaging techniques in combination with Matlab applications are used to measure their speed. Culture media of 1cp, 4cp, 10cp, 25cp, and 100cp are made and cells are allowed to cultivate in them. The movement of *Chlamydomonas* is recorded with the help of laser microscope and digital camera. The recorded videos are then analyzed, closely tracking the path of green algae. The results found are that *Chlamydomonas reinhardtii* move fast in 1cp, while are barely moving in 100cp medium, which is in accordance with our hypothesis.

Mathematics and Science.Biology.39

ZoeAndrews, MelvilleVaughan

University of Central Oklahoma

Ker-CT-Ras Migration in a 3D Cell Culture

Background: The normal architecture of skin is determined by the proliferation and stratification of keratinocytes and the maintenance of the basement membrane. Keratinocytes are the primary skin epidermal cells that are affected by squamous cell carcinoma and basal cell carcinoma. Ras activation is a major pathway that is likely to be involved in cellular changes that produce skin carcinoma. These proteins are essential to cancer progression because of their effect on proliferation and expression of collagen degrading enzymes.

Methods: To better understand the migratory nature of pre-cancerous keratinocytes out of a 3D skin equivalent we used a nested matrix model. The migratory nature of the cells was observed through time-lapse photography. Other methods included cell culture and collagen lattices.

Results: Preliminary data from our lab demonstrates a finger- like migration of Ker-CT-Ras cells out of the nested matrix, suggesting chemotaxis or grouped cell migration. Migration assays out of a nested matrix are currently ongoing.

Conclusion: We hope to gain a better understanding of the migration of precancerous keratinocytes, out of a 3D model. This will help us better understand epithelial organization when affected by oncogenic changes. Ultimately, this data will contribute to understanding the mechanisms of epithelial cells, their migration, and pathogenesis of metastases

Mathematics and Science.Biology.40

DelaneyWilliams, SarahCusack

Southwestern Oklahoma State University

Stroke Strikes the US: An Analysis on Stroke Statistics In The US

The purpose of this Health Statistics project was to describe trends in mortality rates due to stroke in the United States. We hypothesized that females would have a higher mortality rate than males in the US due to a stroke. We also hypothesized that there would be a positive correlation between smoking and mortality rates due to stroke. There were obvious trends in the data to develop conclusions from. We created graphs, ran an ANOVA test, a t-test, and computed correlation values using Microsoft Excel in order to analyze statistical differences in mortality rates relating to race, gender, and other variables. Through a correlation value, we found a strong positive correlation between smoking and AAMR, but no significant difference in AAMR was detected between genders.

Mathematics and Science.Biology.41

JosephWagner, MelvilleVaughan, GangXu

University of Central Oklahoma

Measuring the Material Properties of the Engineered Tissue

The objective of this study is to determine the mechanical properties of the fibroblast-populated collagen lattices as the dermal-equivalent engineered tissue. Fibroblasts reorganize the collagen matrix by applying the traction and tensile forces that are important for the homeostatic morphology and material properties of the extracellular matrix. During development, the collagen lattices undergo dramatic compaction and contraction processes that lead to changes in their elastic properties. The mechanical properties of the tissue in turn affect cell differentiation and functions. In this study, we designed and built a microsphere-based magnetic indentation system to measure the regional material properties of the engineered tissue during development or treatment. The indentation forces were controlled by varying the magnetic forces on the ferric microsphere under either permanent or electro magnets. The resultant tissue indentation was directly visualized by an optical coherence tomography imaging system. In a preliminary set of experiments on engineered tissue a micro-Newton indentation forces have been applied and resulting indentation has been measured. It was determined that changes in the elastic properties of the tissue during development are correlated to the increased compaction and contraction of the tissue by the fibroblasts. The technique and results will shed new light on the biomechanics and mechanobiology of the tissue in developmental or during wound healing.

SarahVrla

University of Central Oklahoma

Genetic structure and the potential for hybridization in populations of *Peromyscus* spp. of plateau regions in western Oklahoma

The biological species concept defines separate species as those being unable to interbreed or produce viable, fertile offspring in sympatric areas. Morphological or genetic differences also have been used to recognize species in both sympatric and non-sympatric distributions. In many instances, hybridization between closely related species occurs in sympatric areas. This phenomenon is common in the genus *Peromyscus*. The white-footed deermouse (*Peromyscus leucopus*) and the North American deermouse (*P. maniculatus*) are sympatric across much of central and eastern North America. Both are considered habitat generalists, but do exhibit distinct preferences as *P. leucopus* predominately occurs in woody or brushy areas and *P. maniculatus* is found predominately in grassy areas. In the plateaus of Four Canyons Preserve in western Oklahoma, specimens could not be identified as either *P. leucopus* or *P. maniculatus* using morphological characteristics, and it has been hypothesized that these individuals represent hybrid samples. In order to investigate the genetic structure of this population and determine if hybridization between these species is occurring, I am utilizing microsatellite data and a species identification marker to compare to specimens from allopatric regions to samples in Four Canyons Preserve.

Mathematics and Science.Biology.43

ClaireSmith

University of Central Oklahoma

A qualitative survey of ultraviolet (UV) reflective morphology in mammals

Communication in the ultraviolet (UV) has an array of adaptive functions such as foraging, social signaling, sexual selection, nectar-location, territory marking, etc., and is known to occur in a wide variety of taxa including plants, insects, reptiles, birds, and mammals. Communication in the UV requires some form of signaling mechanism, in the form of UV reflective morphology (i.e. hair) as well as a visual system capable of interpreting wavelengths in the upper UV range (390nm). Reflection of ultraviolet light by morphological markings in the kangaroo rat, *Dipodomys ordii*, has been confirmed (McDonald et al., unpublished). This UV-reflective morphology has been validated quantitatively through UV-VIS photospectrometry and subsequently corroborated qualitatively with UV-photography. This method incorporates the UV-reflective standard Fluorion to visually discriminate between UV-reflectivity and absorption while also allowing us to estimate the degree of reflectivity observed. Using this approach, we examined UV-reflective morphology in a variety of mammalian species. Here we present our preliminary findings of species that exhibit some degree of UV reflective morphology. These results qualitatively suggest UV-reflection among these species, though further study is needed to determine if any of these morphologies have any adaptive significance or are the product of neutral selection.

Mathematics and Science.Biology.44

GaryThomas

University of Central Oklahoma

Population Structure and Genetic Diversity of Mediterranean Geckos (*Hemidactylus turcicus*) at the University of Oklahoma (OU) North Oval

The Mediterranean gecko is from the Middle East and has become an exotic species in the United States, living on building walls. Once these geckos are established in an area, they venture out via slow dispersal due to their small territorial range. The invasion of geckos at OU were established in the 1940-50's after escaping from research labs at one or both of two sites: Richards Hall and the Clock Tower. We are studying OU to compare it to other locations in central Oklahoma, close to the northern end of the species' U.S. range. On OU's North Oval, we sampled 16 buildings with 9-20 samples per building so far. Our goal is to have 20 per building. We collected 210 samples from North Oval and genotyped 16 micro-satellites per individual to evaluate genetic variation and differentiation. We expected multiple sub-populations of geckos within the North Oval. We found two distinct clusters. Future data will allow further exploration of how exotic and invasive species adapt to an urban life in colder climates.

CarlieJennings

University of Central Oklahoma

A qualitative survey of ultraviolet (UV) reflective morphology in bats

Communication in the ultraviolet (UV) has an array of adaptive functions such as foraging, social signaling, sexual selection, nectar-location, territory marking, etc., and is known to occur in a wide variety of taxa including plants, insects, reptiles, birds, and mammals. Communication in the UV requires some form of signaling mechanism, in the form of UV reflective morphology (i.e. hair) as well as a visual system capable of interpreting wavelengths in the upper UV range (390nm). Reflection of ultraviolet light by morphological markings in the kangaroo rat, *Dipodomys ordii*, has been confirmed (McDonald et al., unpublished). This UV-reflective morphology has been validated quantitatively through UV-VIS photospectrometry and subsequently corroborated qualitatively with UV-photography. This method incorporates the UV-reflective standard Fluorion to visually discriminate between UV-reflectivity and absorption while also allowing us to estimate the degree of reflectivity observed. Using this approach, we examined UV-reflective morphology in a variety of bat species (Order Chiroptera). Here we present our preliminary findings of species that exhibit some degree of UV reflective morphology.

DianeDixon, AlexisBurgess

Southeastern Oklahoma State University

The Effects of Intestinal Bacteria on the Growth of Cancer Cells

There is increasing evidence that the microbiome within individuals can influence on the overall health of those individuals. Many bacteria are considered probiotic in which their presence in the intestine benefits the health of the individual. The bacteria that belong to the genus *Bifidobacterium* are Gram-positive anaerobic bacteria which are normal intestinal inhabitants that have demonstrated to have probiotic properties. Bacterial strains that were isolated from the feces of residents of a top five longevity village in China were examined. The number of residents in the village who live to be 100 years old is five times the international average and the incidence of cancer is ten times lower than in the United States. One bacterial strain was identified as *Bifidobacterium longum* while two strains were identified as members of the *Lactobacillus* genus. In order to investigate the possible contributing role of these bacteria to the longevity and low cancer rates of this population, supernatants from these bacteria were added to a colon cancer line, HCT-8. The growth of the cancer cells were determined by a MTT assay. The results demonstrate supernatants from these bacterial strains inhibit the growth and/or kill the HCT-8 cells. Boiling the bacterial supernatants before adding it to the HCT-8 did not affect the detrimental effect on the HCT-8 cells indicating that the inhibitory substance is heat stable.

Mathematics and Science.Biology.47

MatthewParks, SamuelLe

University of Central Oklahoma

Design and testing of a simple and efficient 2-step method for 18s metabarcode amplification and Illumina library preparation

Metabarcoding methods allow rapid characterization of complex microbial communities through the sequencing of shared, taxonomically diagnostic genetic loci. These methods are particularly useful for identification of diverse microbiota lacking clear morphological traits. Our project seeks to apply DNA metabarcoding to characterize microbial communities present on the shells of freshwater turtle species in Oklahoma. Results will ultimately provide insight into aquatic microbial ecology and response to habitat perturbation. Our preliminary objective is to design a 2-step PCR amplification strategy to simultaneously amplify the V4 and V8-9 hypervariable regions of the eukaryotic 18s ribosomal DNA locus and prepare amplification products for sequencing on the Illumina MiSeq platform. We will use two sets of "fusion" primers: 1) a first set with complementarity to conserved flanking regions of target loci and a tail incorporating short, sample-specific index sequences and complementarity to Illumina sequencing primers; 2) a second set allowing amplification from the first PCR reaction and containing a tail allowing binding to the Illumina flowcell. I will describe my progress toward designing and testing of these fusion primers on several microbial communities isolated from aquatic substrates, based on amplification strength and consistency.

Mathematics and Science.Biology.48

Matthew Parks, Samuel Le

University of Central Oklahoma

Design and testing of a simple and efficient 2-step method for 16s metabarcode amplification and Illumina library preparation

Metabarcoding is a DNA sequencing strategy that allows for high throughput sequencing and DNA-based identification of complex microbial communities. This method is particularly useful for identifying microorganisms based on taxonomically informative DNA sequences rather than morphological or metabolic characteristics. Our project seeks to apply DNA metabarcoding techniques to characterize microbial diversity present on the shells of freshwater turtle species in Oklahoma. Results will ultimately provide insight into aquatic microbial ecology and response to habitat perturbation. Our preliminary efforts involve designing a 2-step PCR protocol to simultaneously amplify the V3-V4 hypervariable regions of the prokaryotic 16s ribosomal RNA locus and incorporate sequence motifs necessary for sequencing on the Illumina MiSeq platform. Our technique relies on two sets of "fusion" primers for PCR amplification: 1) a first set with complementarity to conserved regions flanking the V3-V4 regions and a tail incorporating short, sample-specific index sequences and complementarity to Illumina sequencing primers; 2) a second set allowing amplification from the first PCR reaction and containing a tail allowing binding to the Illumina flowcell. I will present initial results of primer design and testing on several microbial communities isolated from aquatic substrates based on amplification strength and consistency.

Investigating the Impacts of Mutations on Promoter Efficiency

Promoters are specific sequences of nucleotides that serve as initial determinants for the intensity of gene expression. Promoter variation has been shown to contribute to development of genetic disorders and cancer. Our objective was to investigate the impact of promoter variations on bacterial gene expression. We hypothesized that nucleotide changes would impact expression and regulation of reporter genes. To test this hypothesis, we used recombinant DNA technology to combine wild-type and mutant versions of the pLacI promoter with a characterization construct encoding green fluorescence protein (GFP) followed by the LacI repressor under the control of an arabinose inducible promoter in a plasmid. The resulting constructs were transformed into *Escherichia coli*. The wild-type promoter acted as our control while two mutant promoters each contained two or three nucleotide changes. To determine the efficiency of each promoter, we quantified GFP expression by measuring fluorescence. Both mutants exhibited significantly reduced fluorescence, demonstrating small nucleotide changes significantly impact gene expression. To determine if mutations impact repression, different concentrations of arabinose were added to growing cultures. Reduced fluorescence was observed in all samples, suggesting the mutations did not impact repression. Collectively, our data demonstrates that nucleotide changes in promoters can drastically impact gene regulation.

Su XhianLim, HannahKnox, KaylieSmith, ReginaMcGrane

Southwestern Oklahoma State University

Developing Inexpensive Methods for Detection of Toxic Metals in Oklahoma Water

Cadmium is a naturally occurring metal found in the Earth's crust; however, high concentrations may be toxic. This toxicity is especially concerning to Oklahomans due to excessive cadmium pollution in the Tri-State Area Lead-Zinc mining region. In order to develop inexpensive methodologies for the detection of cadmium, we purposed to generate a cadmium-sensitive bacteria using synthetic biology. We hypothesized that plasmids encoding a cadmium sensitive promoter could be used as biosensors for cadmium pollution. We generated a test construct encoding a cadmium sensitive promoter and a control construct encoding a constitutive promoter using recombinant DNA technology; both promoters controlled a pink chromoprotein as a reporter. Our construct was introduced into *E. coli* and exposed to various water samples to test responsiveness to cadmium contamination. Responsiveness was determined by evaluating the intensity of pink pigmentation that resulted from expression of the pink chromoprotein. A slight pink pigmentation was observed in both control and test constructs. The lack of responsiveness observed in our test construct could be due to the absence of cadmium in the water samples; however, pigmentation in the control was also fainter than expected. Further testing of both constructs in the presence and absence of purified cadmium is required.

Bacterial Terminator Efficiency and Expression of Two Reporter Genes

Terminator sequences regulate gene expression and contribute to genetic diseases and cancer development. In an effort to understand the mechanisms and efficiency of terminators, we characterized bacterial terminators in three synthetic biology constructs. Our test construct encoded a constitutive promoter, green fluorescent protein (GFP), terminator, and pink chromoprotein. Control 1 encoded the promoter, GFP, and terminator. Control 2 encoded the promoter, GFP, and pink chromo. A fluorometer was used to measure GFP fluorescence, and all constructs exhibited high-levels of fluorescence. We used a spectrophotometer and visible appearance to compare the expression of pink chromoprotein in all constructs and investigate the impact of terminators on gene expression. Control 1 did not show evidence of pink chromoprotein expression. Control 2 exhibited absorbance in the pink spectra and was visibly pink. The test construct showed minimal pink spectra absorbance and did not appear pink. The ability of Control 2 to exhibit both fluorescence and pink coloration suggests two reporter genes can be produced via the same promoter. The lack of pink coloration in our test construct demonstrates that the terminator can block the visual appearance of pink chromoprotein but is not strong enough to inhibit low levels of expression detected by the spectrophotometer.

Using Synthetic Biology in the Detection of Antibiotics

Synthetic biology is an innovative field with many applications, including the detection of contaminants of environmental concern. The antibiotic tetracycline is used in cattle and humans, and its presence in the environment may impact development of antibiotic resistance. The objective of our research was to construct and test a tetracycline sensitive bioreporter by combining a tetracycline sensitive promoter and the reporter gene, *amiCP*, via recombinant DNA technology. The reporter gene *amiCP* encodes blue chromoprotein and produces a visible color when expressed. We hypothesize that our construct could be used to report the presence of tetracycline via repression of *amiCP* expression when in the presence of tetracycline. We made a construct expressing *amiCP* under the regulation of a constitutive promoter as a control. To evaluate our constructs, we exposed the test and control constructs to tetracycline, and detected *amiCP* expression. The control appeared blue; however, the test construct did not show visible signs of *amiCP* expression in any condition. Upon further investigation, we discovered that the tetracycline promoter lacked a ribosomal binding site; therefore, although expression of *amiCP* occurred, production of blue chromoprotein could not occur. Future work is required to add a ribosomal binding site to our construct.

Temperature is known to impact many important processes including the efficiency of the immune system. The objective of this work was to use synthetic biology to evaluate how temperature impacts gene expression. To do this we used recombinant DNA technology to generate two bioreporter constructs in *E. coli*, one that encoded a temperature sensitive promoter controlling the gene for red fluorescent protein (RFP), and another encoding a constitutive promoter controlling RFP. RFP is a protein found in sea anemones which fluoresces red following exposure to red light and causes a red pigmentation in bacterial cells. We hypothesized the construct containing the temperature sensitive promoter would vary in RFP production while the construct with the constitutive promoter would produce constant levels of RFP. To test each construct, we incubated replicate samples at four different temperatures: 20, 30, 37, and 42°C in broth and agar media. RFP expression was then evaluated at each temperature by visually scoring the pigment intensity of cells on agar media and by using a fluorometer to measure fluorescent intensity. Surprisingly, both of our constructs varied in RFP production in the temperatures tested. This suggests that either RFP or the constitutive promoter are also temperature responsive.

Taelor Kroeker, Jacqueline Young, and Dr. Ratnakar Deole

Northeastern State University

Bacteriocin Produced by Halobacteria from Great Salt Lake Inhibits Gram Positive Organisms

Antibiotic resistance is one of the major issues in nowadays community. Gram + bacterium like Methicillin-resistant *Staphylococcus aureus* (MRSA) is especially concerning due to fast mutation rates reducing the amount of potent antibiotics against it. Resistance of MRSA is attributed to misuse of antibiotics, and development of antibiotic resistance in nature, from MRSA's frequent exposure to antimicrobial compounds within the same environment. Therefore, logical places to look for new potent antibiotics against Gram + organisms like MRSA are environments that MRSA does not inhabit, like hypersaline ecosystem, home of halophiles of all three domains of life. Great Salt Lake, Utah, harbors halophilic bacteria that produce antimicrobial compounds (bacteriocins) for nutrient competition elimination, which are active against MRSA. Antibiotic susceptibility and sensitivity assays were used to determine the domain of isolated microorganisms and whether they produce antimicrobial compounds. Protease test determined the nature of isolated antimicrobial compound. Tricine gel electrophoresis and contact bioassay were used to determine the size of the isolated antibiotic. Sample from Great Salt Lake showed the presence of bacteria producing bacteriocin which could be proteinaceous in nature. Bacteriocin was found capable of inhibiting the growth of Gram + bacteria grown in high salt. Its further characterization would help to better understand its mechanisms of action.

Tulsa Community College

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

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.

KayleaBixler

Oklahoma State University

Antibiotic Resistant Bacteria Isolated From Cystic Fibrosis Patients

Cystic Fibrosis (CF) is an autosomal recessive disease caused by a mutated Cystic Fibrosis Transmembrane Conductance Regulator (CFTR), which is a chloride ion channel. When the CFTR gene is mutated, it causes the protein to be absent or lose function, which leads to dehydration in the lung's airways and also traps mucus inside the lungs. These conditions in the lung generate a perfect environment for bacterial colonization by multiple different species. Chronic bacterial colonization and development of antibiotic resistance are serious concerns for CF patients. Previous studies looking at antibiotic resistant bacteria focused on a specific genus species and it is possible that highly resistant bacteria were missed, whereas this study aims to identify overall resistant bacteria. This study aims to identify highly resistant bacterial populations directly from the sputa of CF patients in Oklahoma. Total bacterial populations from CF sputa were previously collected and cryogenically frozen. Samples from 41 patients were screened for high resistance to four antibiotics: Ticarcillin, Gentamycin, Polymixin B and Carbenicillin. Resistance was measured via Kirby-Bauer disc assays. A total of 11 highly resistant bacteria were identified which are currently being assessed for MICs and will be identified by 16S sequencing.

Antibacterial properties of MgO nanoparticles immobilized polycaprolactone to Staphylococcus aureus

Titanium-based implants have been widely used in orthopaedics and orthodontic surgeries because of their strong mechanical, chemical and biological properties. We have invented a set of steps (e.g. grooving and oxidizing) by which a nanofiber matrix (NFM), composed of collagen (CG) and poly-ε-caprolactone (PCL) electrospun nanofibers, can be coated on a Ti implant without subsequent detachment. A significantly improved osseointegration of CG-PCL NFM-coated Ti over non-coated Ti was observed in our experiments. MgO NP shows promising antimicrobial properties with minimal toxicity¹ and excellent biocompatibility with osteoblast cells in CG-PCL NFM and poly-methyl-methacrylate (PMMA) bone cement.² Prolonged anti-bacterial activities of an implant are possible by tethering anti-bacterial molecules with the implant by microgrooving the implant and subsequently coating the implant with MgO NP tethered PCL NFM.³ The effect of MgO NP tethered PCL on the antimicrobial activities of PCL-NFM is not known, which then leads to this study. The goal of this study is to evaluate the antimicrobial properties of PCL without and with different concentration of MgO nanoparticles using Staphylococcus aureus (ATCC 6538).

Mathematics and Science.Biology.58

LauraPowell

University of Central Oklahoma

Isolation and Characterization of *Gordonia* Bacteriophages

Laura JoAn Powell, Umar Sahi, Hari Kotturi, and Ralph E. Jones

University of Central Oklahoma, Edmond, OK 73034

Bacteriophages (phages) are viruses, known to infect bacterial hosts. Many bacteria are used in a variety of areas such as nutrition, farming, and bioremediation. Our host bacteria is *Gordonia terrae*, found in soils, which has been investigated for bioremediation use. The purpose of this research is isolation and characterization of phages specific to *Gordonia*. We hypothesize that we should be able to isolate unique *Gordonia* phages from various soil samples. *Gordonia terrae* was grown on PYCa media at 28°C. Soil samples were processed using direct and enriched isolation. A plaque assay was performed to detect plaques (voids) in the host bacterial lawn, indicating bacterial cell death. Plaques from each sample were purified and amplified. Purified phages were viewed with a Transmission Electron Microscope to determine the phage morphology. The PCI-SDS method was used for DNA extraction, prior to sequencing. Restriction analysis was done using restriction enzymes. Our preliminary results suggest that we were able to isolate and purify two *Gordonia* bacteriophages from two soil samples. Both bacteriophages have Siphoviridae morphology with a long and flexible tail. The DNA of isolated phages will be sequenced to determine the uniqueness of our phages.

Mathematics and Science.Biology.59

LauraPowell

University of Central Oklahoma

Isolation and Characterization of *Gordonia* Bacteriophages

Laura JoAn Powell, Umar Sahi, Hari Kotturi, and Ralph E. Jones

University of Central Oklahoma, Edmond, OK 73034

Bacteriophages (phages) are viruses, known to infect bacterial hosts. Many bacteria are used in a variety of areas such as nutrition, farming, and bioremediation. Our host bacteria is *Gordonia terrae*, found in soils, which has been investigated for bioremediation use. The purpose of this research is isolation and characterization of phages specific to *Gordonia*. We hypothesize that we should be able to isolate unique *Gordonia* phages from various soil samples. *Gordonia terrae* was grown on PYCa media at 28°C. Soil samples were processed using direct and enriched isolation. A plaque assay was performed to detect plaques (voids) in the host bacterial lawn, indicating bacterial cell death. Plaques from each sample were purified and amplified. Purified phages were viewed with a Transmission Electron Microscope to determine the phage morphology. The PCI-SDS method was used for DNA extraction, prior to sequencing. Restriction analysis was done using restriction enzymes. Our preliminary results suggest that we were able to isolate and purify two *Gordonia* bacteriophages from two soil samples. Both bacteriophages have Siphoviridae morphology with a long and flexible tail. The DNA of isolated phages will be sequenced to determine the uniqueness of our phages.

What's the Dirt about Antibiotic Resistance?

Two classes of chemotherapy are used against infectious diseases, synthetic drugs that are man-made in a lab and antibiotics, those that are derived from bacteria and fungi. Bacteria are capable of producing a variety of many different compounds in order to outcompete other microbes. Of the many components they produce, antibiotics have been of interest in many fields including medical and agriculture. Major advances in medicine and surgery due to antibiotics have saved patients' lives by helping to extend life expectancy. However, pharmaceutical industries no longer consider antibiotic discovery an economically viable investment. The economics of producing new medication to treat antibiotic resistance is too high compared to medication for cancers, allergies, etc. Antibiotic-producing microbes can be found in many different environments. Soil microbes have been found to suppress or prevent many diseases caused by pathogens in agriculture or in livestock. Due to this extensive use of antibiotics, bacterial resistance has soon followed. Microbes would evolve to outcompete the antibiotic-producing microbes by synthesizing newer antibiotics that target these superbugs. In order to find a way to combat these resistances, new discoveries for antibiotics are needed. Soil has provided a great environment for undiscovered microbes. In this study, we are sampling soil in order to find antibiotic-producing microbes against common infectious pathogens.

Mathematics and Science.Biology.61

EricPaul

Southwestern Oklahoma State University

Assessment of the viruses in sewage

Sewage is an indication of the disease profile in a community. Enteric viruses, viruses found in the gastric intestinal tract of humans, are commonly transmitted fecal-oral route and are found in sewage. Some examples of enteric viruses in sewage sampling include polioviruses, enteroviruses, hepatitis A virus, echoviruses, reoviruses, etc. These viruses can cause a wide variety of diseases including hepatitis, encephalitis, myocarditis, meningitis. We expect to observe a seasonal change in disease profile. Using PCR, we analyzed sewage samples for the presence of Adenovirus, Enterovirus, Hepatitis A, Hepatitis G, and Rotavirus using specific primer sets. In addition, we also analyzed sewage samples for bacteriophages. Due to the inevitable escalation of antibiotic-resistant microbes, the use of antibiotics to eradicate/treat bacterial infections is becoming a daunting problem. After a new form of antibiotics is released, resistances in microbes soon follow. Thus, the popularity of phage therapy has reemerged. Phages, the natural pathogen of bacteria, can be used to lyse the membrane of the cell, not allowing resistance to occur. This project focuses on the identification of enteric viruses in the community's sewage sample and the application of bacteriophages that are able to kill antibiotic resistant bacteria.

Mathematics and Science.Biology.62

KaylePatatanian

University of Central Oklahoma

Lynx rufus subspecies of Oklahoma: A genetic test of morphologically identified groups

Historically, three subspecies of *Lynx rufus* (bobcats) were recognized in Oklahoma. Subspecies identification relied on morphological differences, specifically pelage patterns and hair microstructure. A recent study has suggested only two subspecies of bobcats are present in the United States; however, samples from Oklahoma were not included in this study. Our study aims to determine whether the subspecies identified in Oklahoma, based on morphological characteristics, are supported by genetic data. To ensure an accurate population study on *Lynx rufus* in Oklahoma is conducted, we will use 19 microsatellite loci and one species identifier to compare hair samples collected from across the state. Genetic cluster analyses will be performed to determine the number of genetically distinct subspecies in the state.

Jailene Canales

University of Central Oklahoma

Characterizing Developmental Defects in an Avian Model of Maternal PKU

Maternal phenylketonuria [MPKU] is a syndrome of multiple congenital anomalies including cardiovascular malformations [CVMs], brain and growth restriction when a mother with Phenylketonuria [PKU] does not control her dietary intake of Phenylalanine [Phe]. In this study, we aim to establish and characterize an avian model of MPKU. We focused on early developmental defects. METHODS: We investigated the effect of 2500 mg Phe exposure by in ovo yolk injection. Following the injection, the embryos underwent further development for 48 hours until dissection was performed. At HH14-17, India ink was injected into the yolk as a contrast dye. Images were taken of embryos and they were scored based on Drake et. al (2006.) RESULTS: Embryos exposed to high Phe displayed gross morphological changes including developmental and growth delays, anterior and posterior abnormalities, and torsion defects. FUTURE STUDIES: Histological analysis is underway to determine changes in heart development. Currently there is no data interrogating the mechanism by which Phe causes heart defects. We plan to utilize this model to define the mechanism of Phe cardiac teratogenicity which is critical for improving MPKU treatments and outcomes.

ConnorSlattery

Southwestern Oklahoma State University

Effects of commonly used garden pesticides on the development of a sexually selected trait.

Little is known about how chemical contaminants affect the heritability of traits and understanding this interaction is vital to knowing how populations will respond to the presence of contaminants. We used a common garden insecticide to see how it affects the development and heritability of a sexually selected trait (the posterior gnathopod) in a freshwater amphipod species. Since sexually selected traits are large sinks for resources, they may be more sensitive to environmental change than other traits. We tested two amphipod populations from different environments that likely had different exposures to pesticides. Individuals from each population were raised in low concentrations of a commonly used insecticide, malathion. The concentrations used were within the range typically found in nature. We compared the enlarged gnathopod of males to two control traits: the smaller female gnathopod and a similar-sized trait, the proximal segment of a walking leg, both of which are not under sexual selection. The research will provide insights into how manmade changes affect aquatic ecosystems, and provide knowledge of how development of organisms, including human's morphology, are affected by the presence of chemicals.

Mathematics and Science.Biology.65

KaylePatatanian

University of Central Oklahoma

Analysis of cardiac teratogenicity of phenylalanine using the avian model: the role of the focal adhesion pathway

Maternal phenylketonuria (MPKU) is characterized by the teratogenic effects of phenylalanine (Phe). High levels of intrauterine Phe cause cardiovascular malformations (CVMs), intellectual impairment, microcephaly, and low gestation mass. Mothers with PKU must maintain a strict diet to insure serum Phe concentrations remain below $360 \mu\text{M}$ to avoid these congenital defects. Previous functional genomic studies from our lab have determined the importance of the focal adhesion pathway (FAP) in the development of heart defects caused by MPKU. Our project aims to visualize mRNA expression during stages HH10-14 in chicken embryos using in-situ Hybridization (ISH). This will allow us to qualitatively assess the expression of genes associated with the FAP in heart and out flow tract (OFT) tissue. Hepatocyte growth factor, the ligand for c-MET tyrosine kinase receptor is one of six genes we identified and has been shown to promote angiogenesis. Also, other in-situ Hybridization studies have shown that HGF is present in the pharyngeal region of developing embryos. Our project goal is to characterize expression domains for all six differentially expressed FAP genes in Phe treated embryos.

ShaylaMiller

Southwestern Oklahoma State University

The Battle of the Sexes: How Female Condition Affects Conflict Over Mate Guarding Duration in *Hyalella* Amphipods

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 hypothesize that females in poor condition will be exposed to longer mate guarding periods because they are unable to resist male pairing attempts. We will test this hypothesis by varying the amount of spirulina, a high nutrient protein powder, that is included in female's diets. One group of females will receive a lower quality diet and the other group of females will receive a high-quality diet. A female from one of the two diet treatments and a male will be added to the same environment and pairing durations recorded. We predict females receiving the lower quality diet will have longer pairing durations. This research is important to understanding female trait that mediate sexual conflict over pairing duration in amphipod populations.

MicahByrne

University of Central Oklahoma

Wiggledon: Isolation of a Microbacteriophage from Oklahoma Soil

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, amplification, and characterization of microbacteriophage Wiggledon. Wiggledon was isolated using *Microbacterium foliorum* as the host. The soil used for isolating phage was collected from a red wiggler worm farm in Oklahoma City, Oklahoma (35°29'6"N 97°35'29"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 Promega Wizard DNA Clean-Up Kit method. In the future, we plan on sequencing the phage DNA using Illumina technology and annotating our phage genome using DNA Master. Here we report the isolation, amplification, and characterization of microbacteriophage, Wiggledon from Oklahoma soil. This study will help to expand the knowledge of bacteriophages in Oklahoma soil.

EmilyBurgess

Southwestern Oklahoma State University

Comparative Rehydration of Vertebrate Natural History Museum Specimens

The Natural History Museum at Southwestern Oklahoma State University houses an important vertebrate zoology collection from the state of Oklahoma dating back to 1929. These specimens vary in quality of soft tissue conservation, including specimens preserved in liquid and desiccated states. For this study we replicated the rehydration procedure described by Singer (2014) to examine the effects of rehydration on different types of vertebrates. Specimens were selected from the collection based on their small relative size and condition, and include representation from fish, toads, salamanders, snakes and turtles. Dehydrated specimens were hydrated with DI water and thymol before being staged through increasing concentrations of ethanol. Preliminary results show consistent mass increases between 70% and 95% across the different organisms as well as a notable increase in pliability and improvement in physical appearance. These results support the utility of rehydration techniques in collections management as well as the recovery of specimens for research.

Mathematics and Science.Biology.69

FolasadeOlowe, CarolineBentley

University of Central Oklahoma

Analyzing and Developing Cultural Competency in Undergraduate Pre-Health Students

The American Association of Medical Colleges lists cultural competence as essential for students entering medical school so that they can provide quality health care to diverse people. Despite this, there are few studies about cultural competency in undergraduate students. The goal of this project is to assess cultural competence in undergraduate biology students at the University of Central Oklahoma, then provide them with opportunities that will assist them in increasing their cultural competence. A cultural competency survey was administered to 120 pre-health students. Results showed that 46% of the sophomores and 62% of the seniors had traveled abroad, but only 11% of sophomores and 44% of seniors reported the ability to speak more than one language. Furthermore, 36% of sophomore and 31% of senior pre-health students indicated they have taken a class that teaches about a different culture. However, 54% of the sophomores and 72% of the seniors indicated a desire to learn more about different cultures. Additional results are being compiled and will be presented. Also, a brochure is currently being created that lists university courses and minors that provide intercultural exposure. The brochure of recommended courses will be posted on the UCO website, as well as distributed to students during advising. Additionally, workshops are being planned at UCO to focus on the topics of cultural competency, implicit bias, and stereotyping in regards to race, gender, and sexuality.

BrendanHarrison

Southwestern Oklahoma State University

How Sex Ratios Influence Pairing Duration in *Hyalella* amphipods

While sexual conflict research has exploded over the past few decades, we know relatively little about how demographics affect sexual conflict in nature. Sex ratio is a demographic parameter that can affect sexual conflict through male-female encounter rates, which will affect harassment levels experienced by females. The purpose of this study was to test the effects of sex ratios on pairing duration in a freshwater amphipod species in the genus *Hyalella*. We hypothesized that populations with male-biased sex ratio would experience longer pairing durations than populations with female-biased sex ratios. To test this hypothesis three habitats of replicated populations that vary in sex ratio will be set up: female-biased, male-biased, and equal sex ratios. Our hypothesis was formed because in a female-biased population females are more likely to resist male harassment, while in a male-biased population it becomes costlier in terms of energy to attempt to resist male harassment because more males will be harassing females. Therefore, females in the male-biased population may accept the costs of prolonged guarding periods over costly resistance to pairing. This study will serve to provide important insight into how changes in sex ratio change pairing behavior.

Mathematics and Science.Botany.01

ChadKing, CodyHanks, ZachJones

University of Central Oklahoma

Preliminary assessment of a riparian forest along the Washita River in western Oklahoma

Trees in semi-arid grasslands of the Great Plains are often restricted to riparian corridors due to higher water needs. This is also coupled with agricultural practices that often remove trees for various needs. As such, riparian forests could be legacies of land-use patterns and climate change in an environment that can experience frequent droughts. We investigated a riparian corridor along the Washita River and adjacent agricultural landscape in Custer County, Oklahoma in order to relate tree diversity, tree ages, radial growth patterns, and tree establishment patterns to land-use history and climate. Transects were established at increasing distances from the river. Increment cores were collected from trees to estimate tree ages, radial growth patterns, and establishment patterns. One hundred and ten cores were collected from seven species. The largest cored tree was bur oak (*Quercus macrocarpa* Michx.) (diameter 138.7 cm) while the smallest was western soapberry (*Sapindus saponaria* L. var *drummondii* (Hook & Arn.) L.D. Benson). The oldest tree was bur oak (149 y.o.) while the oldest tree found for three species was <20 y.o. Preliminary analysis suggests that the oldest trees were along the transect closest to the Washita River and the youngest trees were located along the transect furthest from the river within an agricultural field. We are in the process of expanding this research to another location and assessing spatial patterns of tree establishment.

Mathematics and Science.Botany.02

LisaCastle

Southwestern Oklahoma State University

The Next Wave of Invasive Plants in Oklahoma: Ecosystem Threats and Management Tactics

The Oklahoma Invasive Plant Council has identified twelve invasive plants which are already established and causing problems in Oklahoma as "The Dirty Dozen." While these plants continue to cause problems for natural and artificial systems throughout the state, conservation attention is now being focused on "Watch List" plants. "Watch List" plants have potential to disrupt ecosystem function, but are not currently considered to be so widespread that prevention is impossible. Students in Terrestrial Ecology at Southwestern Oklahoma State University investigated fifteen of these "Watch List" plants and categorized them based on the problems they cause to ecosystem services and the strategies suggested for monitoring and managing population spread.

Mathematics and Science.Botany.03

EmilyMoore, MitchellHowe, PerriMcGill, PhillipNguyen, DevinWidick, AmyHofeld, LisaCastle

Southwestern Oklahoma State University

The Next Wave of Invasive Plants in Oklahoma: Mapping and Monitoring

In order to prevent the spread of invasive plants, people need to know where the plants are a problem. Many different on-line sources compile information about locations of plant species, but do so in different ways. We used four different on-line tools: the USDA Plants Database, the Early Detection and Distribution Mapping System (EDDMapS), the Oklahoma Vascular Plants Database, and collections of herbarium specimens aggregated through the SEINet Portal, to determine the locations of fifteen species identified as [Watch List](#); invasives by the Oklahoma Invasive Plants Council. We report on correspondence and disparity between the tools and make suggestions regarding both where the plants are and where to find information about where the plants are.

Mathematics and Science.Botany.04

YvetteTavarez, ElizabethHicks, SkylerMills, FaithOkorochoa, LisaCastle

Southwestern Oklahoma State University

Categorizing Wild-Harvested Medicinal Plants for Better Management Decisions

Medicinal plants that are collected in the wild may be vulnerable to over-harvest for many different reasons, ranging from the specificity of their habitat requirements to the fluctuations in commercial demand. The United Plant Savers's At-Risk Assessment Tool has been used to rank the vulnerability of plant species based on answers to questions regarding the five areas: a plant species's life history, population characteristics, habitat, demand, and method of harvest. The tool has been useful in identifying top conservation priorities, those plants with the highest overall score, but less useful when examining the many plants with "high but not extremely high" vulnerability scores. Students investigated wild-harvested plant species that had previously been assessed with such "high but not extremely high" scores and proposed conservation actions for them. Here we report on how these plant species can be grouped based on management strategy and how well the resulting classification corresponds to the scores for each area. We conclude that for species with "high but not extremely high" total vulnerability scores, the scores for each area are more useful to conservation practitioners than the absolute total score.

Mathematics and Science.Chemistry.01

FaithOkorochoa, TimothyHubin

Southwestern Oklahoma State University

Primary amine pendant arms useful for conjugation of cross-bridged tetraazamacrocycles to other bioactive groups

Cross-bridged tetraazamacrocycles have made important contributions as ligands that strongly bind transition metal ions. This property is very useful when the metal complex is intended for use under harsh conditions. One application that has benefited from such complexes is medical imaging, where radioactive transition metal ions can be stably bound to the cross-bridge ligand, injected into patients, and used to identify diseased tissues, such as cancerous tumors. Pendant arms can be added to the cross-bridged tetraazamacrocycle to allow conjugation to other biologically active compounds, or biomolecules such as proteins and nucleic acids themselves. The conjugated bioactive compound might perform various therapeutic activities, while the cross-bridged tetraazamacrocycle metal complex attached serves as an imaging agent to help illuminate the biological effect of its conjugated partner. In this project, we are developing the synthesis of a primary amine pendant arm to the known ethylene cross-bridged tetraazamacrocycles. This functional group is well-known for its ability to be conjugated to biomolecules. Synthetic and characterization methods and results for these novel compounds will be presented.

Mathematics and Science.Chemistry.02

TannerTadlock, TimothyHubin

Southwestern Oklahoma State University

Pyridine linked bis cross-bridged tetraazamacrocycles

Bis cross-bridged tetraazamacrocycles, and their transition metal complexes, have become one of the most effective classes of CXCR4 chemokine receptor antagonists. These cell surface receptors are important to a number of disease states, including HIV, cardiovascular disease, and cancer. Our group has continued to produce new analogues of these compounds in an effort to improve further the efficacy, specificity, and drug-like properties of this class of compounds. In this presentation, we will describe the synthesis, chemical characterization, and biological activity of a new series of bis cross-bridged tetraazamacrocycles in which the unit linking the two macrocyclic units is a nitrogen-containing pyridine, rather than the typical all carbon aromatic linking units of our previous compounds. Results include the apparent production of a 2+2 cyclic version of our typical ligands apparently driven by the change to the pyridine linker.

Mono- and bis-cross-bridged tetraazamacrocycles with thiol pendant arms for biomolecule conjugation

Cross-bridged tetraazamacrocycles have made important contributions as ligands when their metal complex is intended for use under harsh conditions. Applications that have benefited from such complexes are: oxidation catalysis, medical imaging, and protein-binding drug molecules. Bis cross-bridged tetraazamacrocycles, and their transition metal complexes, have become one of the most effective classes of CXCR4 chemokine receptor antagonists. These cell surface receptors are important to a number of disease states, including HIV, cardiovascular disease, and cancer. Our group has continued to produce new analogues of these compounds in an effort to improve further the efficacy, specificity, and drug-like properties of this class of compounds. In this presentation, we will describe the synthesis, chemical characterization, and biological activity of a new series of bis cross-bridged tetraazamacrocycles in which the cross-bridged macrocycle is appended with either a thiol or primary amine pendant arm. These pendant arms are intended to allow conjugation to biologically active compounds, or biomolecules such as proteins and nucleic acids themselves. Once conjugated, the bis cross-bridged tetraazamacrocycles unit would serve as the targeting unit which would bind specifically to cells expressing high concentrations of CXCR4 on their surfaces, such as certain cancer cells. Synthetic and characterization methods and results for these novel compounds will be presented.

Southwestern Oklahoma State University

Sterically hindered cross-bridged tetraazamacrocycles

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.

Mathematics and Science.Chemistry.05

TimothyHubin

Southwestern Oklahoma State University

Novel ethylene cross-bridged tetra- and penta- azamacrocycles

Ethylene cross-bridged tetraazamacrocyclic ligands have gained common use in applications where transition metal complexes must withstand harsh aqueous conditions, such as oxidation catalysis, biomedical imaging, and bioinorganic medicinal compounds. We wish to add additional members to this ligand family by (1) using sterically-hindered parent tetraazamacrocycles; and (2) expanding the macrocyclic parent to pentaazamacrocycles. Here, we present strategies for producing both new kinds of ethylene cross-bridged azamacrocycles and their transition metal complexes.

Mathematics and Science.Chemistry.06

DanielMcInnes

East Central University

Polycyclic Aromatic Hydrocarbons: Photoionization Efficiencies vs. HOMO-LUMO Gaps

Polycyclic aromatic hydrocarbons (PAHs) are relevant in many fields. Johansson and coworkers measured the photoionization-efficiency (PIE) curves for various PAHs. PIE curves can be used to determine photoionization cross-section curves of compounds, which are useful for identification purposes. Photoionization cross-section curves were determined for the PAHs pyrene, fluoranthene, chrysene, perylene, and coronene. Our study involves determining HOMO-LUMO gaps of PAHs, and comparing them with the corresponding photoionization cross-section curves.

Mathematics and Science.Chemistry.07

Jia XuanMak, SanjeewaGamagedara

University of Central Oklahoma

HPLC Method Development and Validation for Quantitative Determination of Lung Cancer Biomarkers in Urine

Lung cancer is the most common cause of cancer-related death in men and second most common in women. There are no good clinical markers that can be used to diagnose lung cancer at an early stage and predict its prognosis have been found. A recent study analyzed metabolites in plasma and serum blood samples from lung cancer patients and individuals without cancer using GC/MS and identified a set of metabolites differently expressed in cancer patients. Based on this study, we developed an high performance liquid chromatography (HPLC) diode array detection (DAD) method to detect fumaric acid, L-glutamic acid, pyruvic acid, inosine, and creatinine simultaneously in urine. Creatinine was included to account for the renal dilution. Baseline resolutions for all five biomarkers were obtained in synthetic urine matrix by using a 5% methanol and 95% of 0.6% acetic acid, using a C18 column. The developed HPLC method was validated in synthetic urine matrix using analytical method validation parameters such as linearity, accuracy, reproducibility, robustness, limits of detection and quantitation 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.

Mathematics and Science.Chemistry.08

RandallMaples

East Central University

Transport and Recovery of Fe₃O₄ nanoparticles through limestone and dolomite rock.

Nanomaterials are used in an increasing number of applications, thus potentially leading to a wide variety of engineered nanoparticles being released into the environment at some point as devices and materials are disposed of. Thus, it is important to be able to assess the fate of these engineered materials and their distribution in groundwater and the subsurface. This study continues the examination of the movement and recovery of engineered Fe₃O₄ nanoparticles through environmental matrices, using locally sourced water and sedimentary rocks.

Mathematics and Science.Chemistry.09

CassandraWeeks

Northeastern State University

Synthesis of trans-Vitamin D2

The synthesis of the trans-vitamin D2, via its sulfur dioxide adduct, is presented here. The trans isomer of vitamin D2 will be used as a model molecule, for the study of the photo-sensitized photoisomerization of vitamin D2 from its trans isomer to the naturally occurring, biologically active, cis isomer. The photoisomerization study will help advance the synthesis of a cis-vitamin D5 intermediate, subject to a different, multistep synthesis of 1 β -hydroxyvitamin D5, a cancer chemopreventive agent. The synthesized trans-vitamin D2 was purified by column chromatography and characterized by ¹H-NMR spectrometry. The overall chemical yield was of 71%.

Mathematics and Science.Chemistry.10

RachelHoffmeister, Sung-Kun (Sean)Kim

Northeastern State University

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

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 a couple of 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 with only the use of BNAs and a T_m value measurement.

MichellePham

University of Central Oklahoma

Isolating Bioactive Marine Invertebrate Extracts Using Brine Shrimp Lethality Assay Screening

Natural products are defined as small molecules extracted and 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 well with the cytotoxicity of human cancer cells from the lung and colon lining. The aim of this work is to identify cytotoxic bioactive compounds for their potential use in pharmacology from screening marine invertebrate extracts. The evaluated extracts are derived from the University of Oklahoma Schmitz Sponge collection, which contains over 300 marine invertebrate samples. Each extract is screened utilizing the brine shrimp assay at a low, medium, and high concentration; 10.0 ppm, 50.0 ppm, and 100 ppm. Extracts indicating 70% lethality or greater are reinvestigated using a confirmation assay. Promising extracts will be fractionated by chromatographic methods, and then the bioactive compound identified using nuclear magnetic resonance spectroscopy, mass spectrometry and infrared spectroscopy.

Mathematics and Science.Chemistry.12

JordanStaggs, CourtneySchartz

University of Central Oklahoma

Kinetic and Structural Studies of Histidine-tagged Tetrahydrodipicolinate N-succinyltransferase

Tetrahydrodipicolinate N-succinyltransferase (THDP succinyltransferase) catalyzes the reaction of tetrahydrodipicolinate (THDP) and succinyl-CoA to form L-2-succinylamino-6-oxopimelate and coenzyme A (CoASH) in the succinylase branch of lysine biosynthesis. Because lysine is an essential amino acid to humans, THDP succinyltransferase is a potential target for designed antibiotics. The DapD gene encodes the enzyme. While DapD from a number of sources has been characterized, no data exists for the enzyme from *Serratia marcescens*, a pathogen known to frequently cause hospital-acquired infections. In our lab, the crystal structure of THDP in Apo form and in complex with an activator is under investigation.

The protein was expressed and purified. Based upon SDS/PAGE, the expressed protein is 95% pure and 3 liters of culture produced 50-80 mg of protein.

Initially, the PEG/ION screen was used to find the crystallization condition. Using this screen, several conditions produced crystals. A solution containing ammonium acetate and polyethylene glycol 4000 produced small crystals. Therefore, this crystallization condition is being modified to produce diffraction-quality crystals.

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CharlesCrittell

East Central University

Papain is an enzyme found in papaya plants. It is a thiol protease and contains a sulfhydryl group in the active site. The substrate, N-benzoyl-arginine-p-nitroanilide (BAPNA), is used, which is hydrolyzed by papain to form a bright yellow product, p-nitroaniline. The reaction is monitored spectrophotometrically by measuring the rate of formation of the p-nitroaniline product as a function of the increase in absorbance of the solution at the lambda max of p-nitroaniline (400 nm) over time at various substrate concentrations. Lineweaver-Burke double reciprocal plots are used to determine Vmax and Km of the enzyme. The effect of pH on enzyme activity will also be explored.

Mathematics and Science.Chemistry.14

KatrinaBetz, MaxwellArcher, jasonwickham

Northwestern State University

Study of an Iodine Distribution in Western Oklahoma Brine Waters

In the late 1970's, it was discovered that the brine waters of NW OK contain significant amounts of Iodine (above 60 ppm). However, the exact amounts and distributions of Iodine throughout this region were unknown. Currently, the majority of the world's supply of Iodine comes from mining Iodate minerals in Chile (≈ 65%), brine water aquifers in NW Oklahoma (≈ 5%) and Japan (≈ 25%), and seaweed extraction. With the growing need for Iodine compounds in the various fields the demand for Iodine is higher than ever. Thus, Iofina has recruited the aid of NWOSU to quantify the Iodine concentrations and distribution throughout the brine aquifer, as well as, determine the longevity of these iodine concentrations. Currently, this study has led to the discovery of new sites within the aquifer that may be of commercial interest and has taken an in-depth look at four of these possible sites, as well as, measuring iodine fluctuations up to 100 ppm which is a much larger fluctuation than the expected 10 ppm. Currently, we are investigating rather these fluctuations are due to the changed from vertical to horizontal wells or inhomogeneity within the brine aquifer.

VivekSwami, VinaySwami

University of Central Oklahoma

The Synthesis of Aluminum Clusters via Basic Dissolution of Aluminum Hydroxide Gel to Mimic High pH in an Aqueous Environment.

Aluminum clusters have previously been synthesized in acidic aqueous environments. Some are naturally occurring and have various uses in industries like materials science and water purification technologies. These previous clusters were synthesized, isolated, and characterized, notably by single crystal X-ray diffraction. Using basic starting materials, we are attempting to synthesize these clusters in aqueous systems and isolate them using a similar process to these previously isolated aluminum clusters. An aluminum hydroxide solution was created from $\text{Al}(\text{OH})_3$ dried gel with the addition of various bases. Like previous work, we attempted to crystallize aluminum clusters from these aqueous solutions. As we move forward, we will include additives that may aid in the crystallization of anionic aluminum clusters in the high pH ranges.

Mathematics and Science.Chemistry.16

ChalitaThompson

University of Central Oklahoma

Training Undergraduate Research Students in Cluster Synthesis and Crystallization Techniques for Single-Crystal X-ray Diffraction

The University of Central Oklahoma (UCO) has participated in a program called "Summer Bridge" that brings STEM students that have just graduated from high school to UCO's campus to do research for the summer before their first year of college. These students have little chemistry experience, yet are expected to participate in research projects on campus. We have recently developed a useful system for training these students in crystallization techniques along with the accompanying chemistry skills needed for routine inorganic cluster synthesis. This training utilized skills like using a micropipette, using molar ratios, making solutions, and using a microscope. The calculations needed for this research are especially common in numerous areas of chemistry and provide a valuable starting point for training research students with little previous chemistry experience. We will review the system that we are using for the training of undergraduate research students for techniques in co-crystallization, cluster synthesis, and numerous other laboratory techniques commonly utilized in aqueous inorganic chemistry.

JoanneAdams

University of Central Oklahoma

Collaboration Between Chemists and Artists in Academic Settings

Scientific innovation thrives off a collaboration of diverse ideas. To encourage more diversity in science we, as academics, must make our subjects more accessible to a variety of learning styles. As a visual learner, and interdisciplinary student of art and science, I had difficulty wrapping my mind around chemistry. Chemistry as a subject is often taught verbally, through lecture and reading. It is difficult to teach visually because we can't see chemicals at the atomic level. Researching with my mentor Dr. Montes, I use my artistic experience to make chemistry concepts more accessible to people who learn visually. I build off the efforts of my mentor, reviewing his lesson plan and use of figures. After my review on what can be improved upon, I illustrate the figures, being careful to use font and colors that are accessible to as many people as possible. The General Chemistry II class of Fall 2018 will review these efforts and offer their input as students. Although people cannot see at the atomic level, people understand chemical properties. Chemical concepts can be represented symbolically for students. This collaboration between chemistry and art makes the sciences more accessible to a diverse student body, ensuring a bright future of scientific discovery.

JessicaMartin, AndrewJenison

Northeastern State University

The Isolation and Purification of Siderophores From Marine Halomonas Strains

The isolation of iron(III)-specific chelators also known as siderophores could have many beneficial properties including antimicrobial or antineoplastic functions. Three different strains of Halomonas bacteria were tested for siderophore production. All three strains were tested using ferric Chrome Azurol Sulfonate (Fe-CAS) in an agar plate. One strain tested positive for siderophore production and was grown in a low iron artificial seawater broth. The broth was centrifuged to collect the supernatant and a polystyrene resin was added to bind to the siderophores in the supernatant. Column chromatography was used to elute the siderophores from the polystyrene resin. The mobile phase was collected and then purified using reversed-phase high-performance liquid chromatography (RP-HPLC).

NhuDang, DanaRundle

University of Central Oklahoma

Synthesis of a Biotin-Conjugated Linker on a Flexible Heteroarotinoid

The objective of this study is to synthesize E15 with a biotin-conjugated linker on a methyl moiety in order to isolate specific Flexible Heteroarotinoid (Flex-Het) binding partners in *Staphylococcus aureus* (ATCC 43300). Flex-Hets are compounds composed of a 4-nitrophenyl group, a linker region, and an aryl ring containing an R group. E15, a Flex-Het containing a methyl R group and a thiourea linker region, has been shown to significantly inhibit the growth of *Staphylococcus aureus* (ATCC 43300). The reagents used to synthesize E15 are m-toluidine and 4-nitrophenyl isothiocyanate. The amino component on m-toluidine is converted to an amide to protect it while a leaving group is attached to the methyl moiety. Following this, the amide is converted back to an amino group. E15 is synthesized at room temperature by reacting m-toluidine with 4-nitrophenyl isothiocyanate for 24 hours, followed by recrystallization. The biotin-conjugated linker replaces the leaving group on E15, and the product is recrystallized and evaluated by nuclear magnetic resonance.

Mathematics and Science.Chemistry.20

KatherineDang, CourtneySchartz

University of Central Oklahoma

Kinetic and Structural Studies of E. coli Dihydrodipicolinate Synthase and Meso-diaminopimelate

Lysine is a member of the aspartate family of amino acids. In general, there are two different pathways for the biosynthesis of lysine; the diaminopimelate (DAP) pathway is found in all bacteria, algae, and plants, and the ϵ -aminoadipic acid pathway seen in fungi and euglenoids. Neither pathway is found in mammals.

Dihydrodipicolinate synthase catalyzes the first step in the DAP pathway for the biosynthesis of L-lysine. The enzyme is feedback inhibited allosterically by L-lysine which reduces enzyme activity by ninety percent compared to the uninhibited activity. The kinetic mechanism for DHDPs is ping pong with pyruvate binding first to apo-enzyme followed by generation of a Schiff's base between pyruvate and K161. Subsequent loss of a proton from the α -methyl group of the bound pyruvate leads to formation of an enamine intermediate.

Based on protein docking studies several substrate and transition analogues of DHDPs have been designed. Kinetic and structural studies was performed on meso-diaminopimelate (meso-DAP). Meso-DAP is a weak activator of DHDPs, increasing the rate of the reaction by 20%.

Crystals of dihydrodipicolinate synthase co-complexed with meso-DAP formed in PEG 3350, sodium tartrate, and HEPES at pH 7.5. The diffraction data will be collected at the OU X-ray facility. Structural studies elucidate the binding site for meso-DAP.

*This research is funded by Institutional Development Award (IDeA) from the National Institutes of Health (P20GM1034

Northeastern State University

HYPEREXPRESSION OF BIOFILM-BREAKING ENZYMES AND DISTURBANCE OF BIOFILM FROM STAPHYLOCOCCUS AUREUS AND STAPHYLOCOCCUS EPIDERMIDIS

The formation of biofilm by bacteria poses serious challenges in the treatment of many infectious diseases. To address this issue, an assay of biofilm from *Staphylococcus aureus* and *Staphylococcus epidermidis* were used with dispersin B (DspB) and lysostaphin (LSS), enzymes that are known to play a role in impeding biofilm and peptidoglycan formation. Dsp B catalyzes the hydrolysis of linear polymers of N-acetyl-D-glucosamines, which are part of the biofilm matrices. LSS is capable of cleaving the crosslinking pentaglycine bridges found in the cell wall peptidoglycan of certain *Staphylococci*. We successfully cloned and purified the two enzymes. We added various concentrations of glucose to bacterial media to determine the optimal growing conditions for the bacteria before adding the two enzymes. We found that each enzyme, Dsp B and LSS manifested, statistically, no significant impedance of biofilm formation in either bacteria, and yet the combination of Dsp B and LSS was shown to be much effective in cleaving the biofilm in *S. aureus*. These observations may support the notion that there is a synergistic effect to impede the formation of biofilm in certain strains of bacteria. The purified Dsp B, in fact, showed the hydrolysis of a polymer of N-acetyl-D-glucosamines present in the biofilm matrix, suggesting that the polymer is a major factor for breaking biofilms and may be useful for further research concerning medical conditions related to antibiotic resistance

Mathematics and Science.Chemistry.22

AndrewHuckleby, Sung-Kun (Sean)Kim

Northeastern State University

INTERACTION BETWEEN CD19 AND ANTIBODY B43

CD19 is a transmembrane protein found on the surface of, and unique to, all B cell lineages. This property allows it to function as the primary antigen for B cell specific antibodies, such as antibody B43. Functioning as the primary antibody for targeting CD19, B43 is currently utilized in genetically engineered T cells for the treatment of acute lymphoblastic leukemia. To learn more and improve upon this binding, we utilized the crystal structure of B43 complexed with CD19 to understand the interactions between the two proteins. This structure showed that it would be reasonable to state that the binding between the epitope and the antigen recognition sites follows a lock and key fashion. Plus, the complexed structure revealed a unique molecular orientation for the extracellular domain of CD19 showing an elongated Beta sandwich. A better understanding of the binding would provide the way to design a more efficient antibody.

Mathematics and Science.Chemistry.23

RajeshNayak

Cameron University

Understanding Spectral Properties of Fluorescent Dyes in Aqueous and Micellar Environment

Photophysical properties of fluorescent probe molecules in aqueous and in confined media have been the subjects of extensive investigation. Among the most widely studied of confined media is the environment of the reverse micelle. Reverse micelle can be used as a simple model system to understand dynamic properties of dye molecules. We will present electronic and hydrodynamic properties of fluorescent dyes in aqueous and confined environment using various steady state spectroscopic techniques

FernandoSalazar-Salas, LizbethRobles-Fernandez, DwightMyers

East Central University

High Temperature Study of the Reaction of Silicon, Titanium and Yttrium Oxides

Reactions of titanium oxide and silicon dioxide are of importance in materials used in high temperature environments. 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. The extent of reaction and temperature range are important questions to answer for this chemical system. Experimental evidence would suggest that a third cation is necessary to have compound formation. Presently we are exploring the reaction of titanium dioxide with silicon dioxide with small amounts of yttrium oxide being added. 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. Results to date will be presented.

UendiPustina, DwightMyers

East Central University

Computational Study of Volatile Aluminum Hydroxide

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. Presently we are to the stage of optimizing the geometry of the molecule. Results to date will be presented.

OladayoSeweje

Cameron University

Synthesis of cyclic Imides using Microwave Radiation

Allowing many chemical reactions to be completed within minutes, microwave heating has revolutionized preparative chemistry. This is a green technology and is becoming widely adopted in both academic and industrial laboratories. Heterocycles are very important functional groups especially in medicinal chemistry. Not only are they pivotal in the synthesis of drugs but also form part of the structure of a diversity of drugs, vitamins, natural products and biomolecules. In this research a clean green method was implemented for the preparation of different cyclic imides from acid anhydrides using aniline or N-substituted anilines with microwave radiation as the energy source. The unsubstituted imides were synthesized by reacting the acid anhydrides with urea using imidazole as a catalyst. These compounds will be evaluated against antibacterial and antifungal species.

GeraldWard, MaggieWard, EmilyCowen, AlexanderChandler

University of Central Oklahoma

The synthesis of Aluminum Clusters using Naphthalene Based Crystallization Agents

Oxy-Hydroxy-Aluminum clusters have various industrial uses, including waste water treatment and materials science. There may also be use for these clusters to remove contaminants from aqueous environmental systems. It is important to synthesize, then isolate these clusters to observe how they will behave and bind in environmental systems to contaminants or surfaces. Using basic starting materials, we are attempting to synthesize these clusters in aqueous systems for study. An aluminum hydroxide solution was created from $\text{Al}(\text{OH})_3$ dried gel with the addition of selenic acid. Then we attempted to isolate the clusters by slow evaporation or by using different naphthalene-based crystallization agents from previous work. Once the clusters were crystallized and observed under a microscope, we planned to characterize them using single x-ray diffraction. Our goal was to synthesize the Al_8 selenate cluster, based on a previously synthesized Al_8 sulfate cluster, using this dissolution method with selenic acid. It is unclear if this cluster is naturally occurring, though the conditions of synthesis are similar to acidic environmental systems including acid mine drainage or acid rain systems.

LindsayMaez, VictoriaBrown

Cameron University

Investigation of Microwave Energy in the Synthesis of Heterocycles Related to Medicinal Chemistry

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. An important class of heterocyclics, derivatives of isatin (indole-2,3-dione), as well as its Schiff and Mannich bases, have already been reported to show a variety of biological activities,

such as antibacterial, antifungal and anti-HIV activities. The wide spectrum of isatin derivatives and their various chemical properties has led to their increasingly expanded use as precursors for the preparation of many biologically active compounds. Hydrazine derivatives of isatin have been found to be active

against Walker carcinosarcoma. In this research isatin derivatives were synthesized using microwave technology. Their antimicrobial activity will be tested.

MicahFoale, Brooke Lizotte, MadisonDuckwall, LoriGwyn

Southwestern Oklahoma State University

Determination of the Sensitivity of an Arsenic Biosensor

Arsenic (As) is of concern locally and globally in drinking water. Commercial As test kits are available; they are time-consuming, involve multiple steps, and create more toxic waste. We utilized synthetic biology to develop a simple and sensitive As biosensor. Previously, we constructed the biosensor using the Biobrick parts J33201 (an As sensitive promoter); E1010 (red fluorescent protein); and pSB1A3 (an ampicillin resistant destination plasmid). Current efforts focused on testing the viability of the bacterial cells in varied arsenite and arsenate media. Moreover, we wanted to determine the levels of "pinkness" based on the amount of arsenite/arsenate present in the media. Growth conditions were quantified measuring the OD-600 of cell cultures grown up to 20 hours. Results showed the growth of the bacteria containing the different BioBrick plasmids did not grow well under any arsenite and arsenate concentrations used. We also noted that the bacteria was not turning pink in the presence of arsenate/arsenite as had been shown in the past. It was concluded that the effective concentration of ampicillin in the growth medium was lower than expected. The quality of cell lines was also suspect. These issues most likely resulted in reduced growth and protein production. These experiments will be reproduced using a higher concentration of ampicillin and re-tested for As sensitivity. Biological systems are a relatively inexpensive approach to creating easy to

JonHenrikson

Southwestern Oklahoma State University

Developing NMR and Visible Spectroscopy Methods to Determine pKa's of Glycine Metal Complexes

Peptidomimetics offers the potential of drug design using small peptide sequences designed to mimic the tertiary structure of a large protein to act as a pharmacophore in the active site. Unnatural amino acids are often used to create tertiary structural features in small peptide mimetics, yet, synthesizing unnatural amino acids still remains a challenge. The use of electron withdrawing groups is a well-known approach to change the chemical properties of a molecule, including the acidity. Our project's goal is to quantify the changes in pKa of previously synthesized ligands with the presence or absence of electron withdrawing groups attached to the molecule in organic solvents. Challenges in determining the pKa's of these ligands include monitoring the equilibrium of a weak acid-weak base chemical reaction and the use of different methods in determining the acidity of a proton in organic solvent conditions, since common aqueous methods do not apply in organic solvent. Therefore, we are applying proton nuclear magnetic resonance ($^1\text{H-NMR}$) and visible spectroscopy as means to monitoring the weak acid-weak base interaction and to quantify the pKa by proton integration and wavelength absorbance changes, respectively.

SindhuBharathi

University of Central Oklahoma

Physio-chemical and Functional Characteristics of Raffinose-oligosaccharide Fortified Yogurt

Yogurt is known for its nutraceutical properties. Beans are a healthy and easily affordable pulse containing good amount of raffinose which has been proven to possess prebiotic properties. The objective of this research is to isolate, characterize raffinose from soybeans and demonstrate practical utility of raffinose by studying its effect on the quality of yogurt. We hypothesize that this research will result in developing a soybean based prebiotic powder and a synbiotic yogurt. Raffinose was prepared from soybeans by soaking, incubation and freeze drying. Raffinose was then quantified using enzyme assay and UV spectrophotometer. 2% milk was fortified with starter culture and raffinose at varying concentrations (2%, 4%, 6% and 8%), studied for changes in physiochemical, fermentation and microbiological properties. These changes will be compared with the effects of commercially available prebiotic powder, inulin (2%). Based on the research work done so far, it has been found that the actual concentration of raffinose in the freeze-dried powder is 1.75 ± 0.03 g/L and that 2% raffinose-yogurt (4 hours) takes lesser time to ferment when compared to 2% inulin-yogurt (6 hours). In the coming days, raffinose-yogurt will be analyzed for changes in microbiological and physiochemical properties.

Separation and Enrichment of Low Abundant Proteins in a Microchannel using Isotachophoresis

Low abundance of circulating proteins in blood is one of the major challenges in on-chip purification and extraction from highly abundant proteins like Albumins. In this presentation, we will demonstrate the separation of low abundant proteins from highly abundant albumin in a microchannel using isotachophoresis (ITP), non-linear electrophoresis. A PMMA (poly-methylemethacrylate) microchannel with a change in cross-sectional area was made using photolithographic processes and solvent assisted thermal bonding. The bonding strength of the microchannel was tested using a universal testing machine and pressurized flow through the channel. The leading electrolyte (LE) was prepared from KOH, Urea, Triton X-100, PVP by adjusting pH to 4.0 with acetic acid. The terminating electrolyte (TE) was 20 mM Acetic Acid, PVP, and Triton X-100. PVP suppresses electroosmotic flow while the urea and Triton X-100 remove precipitates that form during ITP. The ITP experiments were conducted by applying an electric potential of 200 V across the channel and images of sample migrations were taken using a fluorescent microscope.

Mathematics and Science.Chemistry.33

AaronXue, Abul KasemRahman, JefferyLiu

Oklahoma School of Science and Mathematics

The Fight between Antioxidants and Free Radicals

Abstract

Antioxidants are molecules that commonly interact with the free radicals to terminate the chain reaction in biological system in such a way that the vital molecules are not damaged. It is known that there are several enzyme systems within the body that disarm free radicals. This review describes the behavior of antioxidants in battling excessive oxidative stress in the human body. Although free radical creation is essential to cells, the propagation of radicals may grow beyond a healthy limit and damage tissue. Excessive free radicals harmfully oxidize essential biomolecules such as DNA, proteins, and lipids, which causes a breakdown of proper cellular function. For example, radical-induced damage to DNA may cause chromosomal defects that lead to cancer initiation and propagation. While the diseases associated with free radical damage are extensive, they can be grouped based on the type of cell that is oxidized. In this presentation, we will discuss the different kinds of radicals that cause oxidative stress in the body, analyze the common symptoms that result from these radicals, and evaluate antioxidants that impede these reactions from occurring.

Mathematics and Science.Chemistry.34

LeviClements, AmyBrooks, Abul KasemRahman

Oklahoma School of Science and Mathematics

Implications of Aspirin in the Agricultural Field

Aspirin (acetylsalicylic acid) is commonly known as a pain relief and anti-inflammatory agent, however it is less well known that aspirin benefits plants in various ways. Aspirin promotes growth, lengthens lifespan, and strengthens the immune system of plants. In this study, the structure of aspirin and its reactions within plants will be analyzed. Aspirin is the product of acetic anhydride and salicylic acid, which is a substance that is naturally formed in plants in small dosages and protects the plants from diseases. The artificial synthesis of aspirin could potentially be used in large-scale farming to produce healthier crops. Further study on the application and implication of aspirin in the agricultural industry could potentially save money and replace harmful fertilizers.

Julia Hua, Abul KasemRahman, A.K.Fazlur Rahman

Oklahoma School of Science and Mathematics

Types of Hallucinogens as Drugs and Its Effects on the Human Body

Abstract:

Hallucination drugs possess a catastrophic challenge for the society and the medical community. Various studies suggest that the usage of hallucinogens causes many devastating health problems including mental illnesses and the irreversible damage of the nervous system. Hallucinating effect involves the altering of one's senses, where one, for instance, may see or feel something that is not truly there. Common drugs of these type include Dimethyltryptamine (DMT) is an intense naturally-occurring psychedelic that's also found endogenously in the human body. Dextromethorphan (DXM or DM) is a medication most often used believed to be a naturally occurring substance in certain foods or can be chemically synthesized. This presentation will describe the types and chemical structures of hallucinogens and its effects on the human body, including physical and mental illnesses and benefits.

Mathematics and Science.Chemistry.36

GraceWu, SophiePatrock, Ruth AnneDunn, Abul KasemRahman

Oklahoma School of Science and Mathematics

Medicinal Applications of Radioisotopes

In the medical field, radioisotopes are used for two distinct functions: diagnosis and therapy. The four main diagnostic radioisotopes are technetium-99m, thallium-201, iodine-123, and gallium-67, which are used to figure out which areas of the body have accumulated ions that indicate sickness. Doctors combine radioisotopes with other chemicals and activate them on the afflicted part of the patient's body. They also use Single Photon Emission Computer Tomography (SPECT) imaging to emit a single gamma ray into the patient's body. These tests are used to discover bone tumors. After surgery, these medicines can be used to prevent malignancies from growing again. Even though radioisotopes have many medical advantages, they can also cause cancer themselves. These presentations will provide an overview the many drugs made from radioisotopes examining the long term costs and benefits to human health.

Mathematics and Science.Chemistry.37

AubryStomprud, Sung-Kun (Sean)Kim

Northeastern State University

Using Solvate Ionic Liquids to Address Polymorphism in Pharmaceuticals

Polymorphism is the recrystallization of the solid phase of a substance. This recrystallization has posed a problem in the pharmaceutical industry leading to problems of patent litigation. To address this problem, we employed the idea of ionic liquids. By using ionic liquids, the drugs would be potent and since they would be in the liquid form, the solid phase recrystallization would no longer pose a problem. Our research explores the system of Penicillin G and three glycols, Triethylene glycol, Tetraethylene Glycol, and Pentaethylene glycol. We looked at the stability of the solutions by tracking their rates of degradation through IR and UV-vis spectroscopy. We also used tests with *Escherichia coli* BL21 (DE3) to see if the solutions remained biologically active once the penicillin was wrapped by the glycol. Our results showed that the most effective glycol was the pentaethylene glycol and that it remained biologically effective for longer amounts of time than the traditional solution penicillin in water. This establishes the validity of the idea and therefore further research can be conducted to create a nontoxic glycol with similar properties of pentaethylene glycol.

Mathematics and Science.Chemistry.38

UshaKhadka, ShawnaEllis

University of Central Oklahoma

Advances Toward the Utilization of Cucurbit[n]uril and Selected Viologens in Molecular Machines and Devices

Rotaxanes composed of a cyclic host molecule coordinating with an axle of one or more binding sites are key to creating molecular machines and devices. In this study, pseudorotaxanes of cucurbit[n]urils and a series of viologens are created in varying concentrations. After synthesis and characterization, the equilibrium binding constants and binding modes were determined by NMR. These studies will lead to the design of more complicated host guest systems.

StephenMyers

Cameron University

Investigation of Microwave and Ultrasonic Energy in the Synthesis of Heterocycles Related to Medicinal Chemistry

Allowing many chemical reactions to be completed within minutes, microwave heating and ultrasonic energy have revolutionized preparative chemistry. Both are green technologies and as a result, are becoming widely adopted in both academic and industrial laboratories. This is especially true for microwave synthesis but not many applications of ultrasonic energy in organic synthesis have been reported. Heterocycles are very important functional groups especially in medicinal chemistry. Not only are they pivotal in the synthesis of drugs but also form part of the structure of a diversity of drugs, vitamins, natural products and biomolecules. In this poster we will present the results of syntheses of imidazoles and azolines by both microwave and ultrasonic energy. Derivatives of these two classes of compounds are known for analgesic, antifungal, antihypertensive, antiobesity, anticancer and other biological activity.

TheresaHinkle

Cameron University

Microwave Synthesis of Novel Esters Using Sulfuric Acid and Imidazole as Catalysts

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 this research we have investigated the synthesis of several esters using a conventional microwave oven and a new method of purification. We compared these syntheses using both sulfuric acid and imidazole as catalysts, as well as a comparison of acid and acid anhydride products. It was hypothesized originally that the esters could be synthesized using the imidazole as a catalyst with any acid. However, we found that we were not able to obtain product without using anhydride acids. Also, for purification, we found it more efficient for the Sulfuric catalyzed esters to first be mixed with ether and then to wash the mixture with sodium bicarbonate then sodium hydroxide, draining and discarding the lower layer each time. When this is done sodium bicarbonate removes any excess sulfuric and the sodium hydroxide removes excess acid.

Mathematics and Science.Chemistry.41

TrevorEllis

Southwestern Oklahoma State University

Synthesis and Competitive of Reaction Rate Experiments for a Series of Ni(II) Complexed Nucleophilic Glycine Equivalents

The preparation of two Ni(II) complexed Schiff's Base derived nucleophilic glycine equivalents will be described including the synthesis of the required ligands and 2-aminobenzophenones. Additionally, these complexes will be evaluated regarding their utility for the preparation of non-proteinogenic α -amino acids. Two methods of homologation, alkyl halide alkylation and Michael Addition Reactions, will be utilized to evaluate the reactivity of these Ni(II) complexed glycine equivalents compared to previous generations that have been introduced through competitive reaction approaches.

Mathematics and Science.Chemistry.42

ElizabethHicks, TrevorEllis

Southwestern Oklahoma State University

The Design, Synthesis of Novel Ligands for the Optical Purification of α -Amino Acids

Research associated with the application of α -amino acids has been a topic of interest in various scientific fields ranging from agriculture to pharmacy due to the versatility of these relatively simple compounds. One of the hurdles that has slowed progress in these areas has been the access to these compounds in enantiomerically pure form. Therefore the focus of the investigations to be presented will be the development of efficient methods for increasing access to these materials. Specifically, the rational design and preparation of an optically active ligand system will be presented. Additionally, the application of this system for the preparation of α -amino acids will be demonstrated through a dynamic resolution process.

Abul KasemRahman

Oklahoma School of Science and Mathematics

The Chemistry of Medical Marijuana

Abstract

Marijuana is a psychoactive drug from the plant genus *Cannabis* that is used for medical or recreational purposes. Medical marijuana refers to the use of marijuana's chemical compounds to treat diseases, pain, and symptoms. Some of these chemical compounds are called cannabinoid that act on certain receptors to alter neurotransmitter release in the brain. Two of the most prevalent active ingredients of marijuana are Cannabidiol (CBD) and Tetrahydrocannabinol (THC).

Due to previous associations with other illegal narcotics, it has a stigmatism. This stigmatism has played a huge role in the legalization of the drug for medical and recreational uses and has required the industry to show its uses and prove its harmlessness. There has also been concern about the distribution and possible addictions. Governmental agencies have labeled the drug as addictive with no medical use and proving that the drug does have use will be the prerequisite for legalization throughout the United States.

However, medically, Marijuana has been shown to have positive impacts on people suffering from diseases such as Alzheimer's Disease, Multiple Sclerosis, and Post-Traumatic Stress Disorder. Though the physiology of these cures has not yet been proven, the numerous anecdotal evidence combined with the benefit of finding a possible cure for such widespread diseases warrants an in-depth investigation into how marijuana works and how it can be used.

Mathematics and Science.Chemistry.44

StephenMcBride

Cameron University

Photocatalytic Degradation of Acesulfame Potassium Using TiO_2/UVA , $\text{S}_2\text{O}_8^{2-}/\text{Fe}^{2+}/\text{UVA}$, and $\text{H}_2\text{O}_2/\text{Fe}^{2+}/\text{UVA}$ Processes

Acesulfame potassium (ACE) is a ubiquitous artificial sweetener that has recently been shown to be toxic to the environment and damaging to DNA in both mice and humans. Photocatalytic degradation of ACE using TiO_2/UVA , $\text{S}_2\text{O}_8^{2-}/\text{Fe}^{2+}/\text{UVA}$, and $\text{H}_2\text{O}_2/\text{Fe}^{2+}/\text{UVA}$ processes show promising results with complete degradation and 57-80% mineralization of ACE and their resulting products have been shown to be non-toxic to the environment. The reaction kinetics of these two processes are examined.

Mathematics and Science.Computer Science.01

Yan FayChong

University of Central Oklahoma

An Analysis of the Knee Injury Rehabilitation via a Mobile-Computing Approach

Major knee injuries and problems often occur during accidents, recreational activities or sports. Depending on the severity, a knee injury typically takes a long time to recover. Therefore, in order to promote knee recovery, knee exercises have proven to be very crucial and important to build strength and recover the range of motion of the injured knee. However, since the cost of rehabilitation is usually high, most patients would opt to complete it on their own at home. Also, as the rehabilitation protocol is complex by nature, it is very challenging for a patient to accomplish it without any professional guidance. As a result, many patients will not be able to fully recover from the injury. Thus, we have proposed an effective and low-cost approach to overcome this problem. In this project, we used the sensors, i.e., accelerometer and gyroscope, in a smartphone to collect the knee rotation data, and used machine learning techniques, particularly artificial neural network, to analyze the collected data. The goal is to provide an effective solution to help patients achieve effective rehabilitation.

DanielBennett

Northeastern State University

Defeating Multi-Factor Authentication with SIM Swapping

Multi-Factor Authentication (MFA) is a practice websites or applications can use to add an extra layer of protection to authenticate a user. These factors are usually categorized as something you know, something you are, and something you have. MFA is rightfully becoming a common security practice on websites and mobile apps to reduce the risk of compromise. With MFA enabled, an attacker would not only need your password but also the other piece to the puzzle. One common method of providing MFA is Short Message Service (SMS), better known as text messaging. When SMS MFA is used, the user is sent a one-time password to their mobile device to use in authentication. SMS can be exploited by attackers using a method called SIM swapping. SIM swapping occurs when an attacker uses social engineering or a corrupt phone store employee to clone (swap) the requested phone number to a blank SIM card for the attacker. The attacker can now send and receive calls as well as messages using your phone number. This enables the attacker to perform password resets, verify accounts, and more. SIM swapping has been credited for many high value attacks over the past few years. One example is in early 2018, when over \$20 million in cryptocurrency was stolen from Michael Terpin. This research examines SIM swapping and its use as a method to exploit MFA using SMS messaging.

Mathematics and Science.Computer Science.03

Dr. GangQian

University of Central Oklahoma

Building an Algorithmic Trading System

This presentation describes an implementation of a system to trade financial markets algorithmically. We present the workflow including data acquisition via exchange APIs, data modeling via technical analysis, and model assessment via back-test.

Mathematics and Science.Computer Science.04

Dr. GangQian

University of Central Oklahoma

Financial Machine Learning: Using machine learning to enhance the performance of a systematic trading strategy

Machine learning in finance is a unique field. Special considerations need to be made when working with financial data. Samples are not independent or identically distributed. In this research, I show a mean reversion technical trading strategy can be enhanced with the proper use of machine learning, maintaining consistent profitability in harsh markets (Bitcoin). The machine learning enhancement results with a Sharpe ratio more than twice that of the original strategy.

Mathematics and Science.Computer Science.05

BillyAndrew

East Central University

Utilizing Forms to Digitize the Data for PAWS

Pontotoc Animal Welfare Society (PAWS), located in Ada Oklahoma, still collects paper-based data for their daily operations. With a PetSmart Charities grant and support from the McNair Scholars Program at East Central University, we were able to obtain electronic data collection equipment and develop specialized forms for data entry utilizing KoboToolBox. Creating a working and efficient electronic form is vital in making this a viable method for data transfer and entry for PAWS, other humane societies, and small businesses. For non-profit organizations and small businesses, it is crucial to minimize the operating costs. KoboToolBox is free to use for research and humanitarian reasons, making it the perfect choice for this project. In the future, FormHub will be considered for small business and other types of organizations. FormHub will be used much like KoboToolBox but is open source and can be implemented by the organization. We plan to analyze possible database methods. This includes Access and Open Office to build a specialized database to fit the needs of PAWS. The new databases will allow the employees at PAWS to manipulate the data, make simple print outs for the adopters, and keep it updated to provide better adoption rates.

Mathematics and Science.Computer Science.06

MatthewKing

University of Tulsa

Is Second Factor Authentication Broken? An Analysis of 2FA Token Harvesting Techniques and the Transition to Universal Second Factor Authentication

Second factor authentication (2FA) is the process of providing two different authentication factors to gain access to desired resources. 2FA involves combining something the user knows, most commonly a password, with something that they have. The “something they have” ranges from one-time passcodes sent through SMS or mobile applications, to biometrics and hardware tokens. While 2FA is better than simply using passwords to secure accounts, recently released tools reveal critical vulnerabilities for users attempting to secure accounts with SMS or authenticator app-based one-time passcodes (OTPs). This project details how one of those particular tools accomplishes the task of automatically harvesting user credentials and OTPs. Additionally, the project details how Universal 2nd Factor (U2F), an open source authentication protocol, can be used to provide more robust security for user accounts than 2FA. The project discusses features of the protocol’s security as well as issues associated with implementation.

Mathematics and Science.Computer Science.07

JacobHall

University of Tulsa

Problems and Vulnerabilities behind Hyperledger Enterprise Blockchains

Hyperledger claims permissioned blockchains ensure immutability of data in a network. However, the decentralized nature of blockchains opens doors to many security issues not seen in a standard web application. Maintaining blockchain security comes at a compromise of speed and extreme complexity. Developers usually reduce security endorsements to improve performance. Since the blockchain was designed to run arbitrary code, a single compromised peer could provide unauthorized access. This research explores how standard web application testing tools can be used to attack permissioned blockchains. This project lays the groundwork for greater blockchain security in the future.

Mathematics and Science.Computer Science.08

ReidKinder

East Central University

Teaching Your Computer to Think

Teaching a computer to classify data accurately through multi-layer neural network processing is known as deep learning. The MNIST dataset was used to explore and compare machine learning processes to deep learning through packages such as SKLearn, and Tensorflow. Through SKLearn, different dimensional reduction techniques were used to manipulate the dataset, such as Principal Component Analysis (PCA) and T-Distributed Stochastic Neighbor Embedding (t-SNE). PCA and t-SNE were used to reduce the number of dimensions of the dataset, while conserving certain characteristics of the data. Finally, K-Nearest Neighbors (KNN) was used to classify the data after dimensional reduction. After this classification, a graphical representation of the data was presented. An accuracy greater than 85\% on the test set was achieved through this method. Tensorflow was also successfully applied to the data set. Through Tensorflow, we reached a result of greater than 95\%.

Mathematics and Science.Computer Science.09

ChaseMinden

University of Central Oklahoma

Coin Collector: First Introduction and Project with Unity

Before starting this project, I had never used Unity before, I had never programmed in C# before, and I had no idea how to even start making a game. So starting out, I practiced with the tutorials that Unity provided and watched some videos about how to use different parts of Unity. After finishing the coin collecting tutorial, I wanted to try out some of the things that I'd picked up. I started expanding the playing area and experimenting with player and camera controls, and eventually ended up with a 3D terrain and a ball to play as. I wanted to keep improving the game, so I found Adobe Fuse to create a player model and imported the model into Unity to make a new player, and used a prefabricated script to make the first-person movement. Then after this, I started working on scripts of my own to make interactable obstacles and pickups. As the semester came to a close, I started working on finishing touches like animation connections, object organization, and visuals. At the end of the project, I feel like I have a better understanding of how to use different facets of Unity, how to create programs in C#, and how to make the connections between those two. This will be very helpful if I wish to continue making projects in Unity in the future.

Mathematics and Science.Computer Science.10

RobertManley

University of Central Oklahoma

BadDroid: A First-Person Perspective Video Game Project Using Unity 3D

In this project, we are developing a survival based first-person shooter game called BadDroid using the Unity 3D game engine. Making BadDroid has involved learning skills from various online tutorials and then taking them a step further. 3D gun models were coupled with particle effects to create muzzle flashes and impact burns on the environment and enemy robots. The player can select multiple weapons with various properties such as impact force, which causes enemy robots and objects to be pushed backward. In addition to this, each weapon has been given unique sound effects and firing modes. The player can switch between firing modes to change their weapon's rate of fire. By using the alternative fire button, the player can throw grenades at the robots, which bounce off and roll around the environment. These grenades will flash with red lights several times before exploding. Enemy robots wield weapons (that the player can eventually obtain) and have 3D models with custom idle, walking, and running animations. A simple level was constructed with several rooms that contain either destructible objects or spawn points for enemy robots. Upon losing all their health, an animation triggers which causes the player to crash onto the ground before seeing the "GAME OVER" screen. Overall, BadDroid is an ongoing project whose development promotes research in many areas of computing, such as rendering graphics and lighting, optimizing code, and computer-aided design.

Mathematics and Science.Computer Science.11

NicholasMcDaniel

Southwestern Oklahoma State University

Constrained K-Means Clustering Validation Study

Machine Learning (ML) is a growing topic within Computer Science, and has applications in many fields. One classical problem in ML is the question of separating data, and this process is now known as clustering.

One interesting application of data clustering is making insurance adjustments for hail damage to crops. Our project is a validation study of, “Constrained K-means Clustering with Background Knowledge by Wagstaff et. al.

Here we show that a modified k-means clustering approach can outperform more general unsupervised learning when some domain information about the problem is available. In Wagstaff et.al, machine learning was applied to the problem of predicting what soybean production would have been if hail had not damaged crops. Because this is an estimation that many crop insurance agents have had to make, it is a relatively large data set that has been labeled by human experts. Our data suggests that k-means clustering augmented with domain information can be a time efficient means for segmenting data sets.

Our validation study focused on six classic data sets and does not consider the GPS data of the original study. We have published our code onto a SWOSU Github repository to enable other researchers to use our code as a starting point.

Validation studies such as this provide great learning opportunities for students interested in working with Machine Learning, Artificial Intelligence, and other related applications.

Mathematics and Science.Computer Science.12

MarcoMartinez

Southwestern Oklahoma State University

A Validation Study of Time Series Data Forecasting Using Neural Networks

Artificial Intelligence (AI) is a growing topic in Computer Science, and has many uses in real world applications. One application is using AI, or more specifically Neural Networks, to model data and predict outcomes. Neural Networks have been used in the past to predict weather changes, create facial recognition software, and to create self-driving cars. Our project is a validation study of, "Modeling Time Series Data With Deep Fourier Neural Networks" by Gashler and Ashmore, 2016. Gashler and Ashmore trained a Deep Fourier Neural Network to fit time-series data, such as weather. Their method was demonstrated with the weather data obtained from Anchorage, Alaska over a five year period beginning in April of 2009. In our research, we attempt to fit a simpler neural network to the Alaska weather data. We first fit our data with traditional neural network training algorithms. We then expand our research to use machine learning to train the neural network to the Alaska weather data. We believe that we can create a simpler neural network that is still as effective as Gashler and Ashmore's neural network. This validation study provides a useful introduction to Artificial Intelligence for upper level undergraduate students. Completed code will be made public on the SWOSU Github repository. As computing resources and programming environments continue to improve, the value of forecasting will continue to increase. One may see this research as a way to improve famili

JacobMiller, JeremyEvert

Southwestern Oklahoma State University

Validation Study of Image Segmentation Algorithms

Developments in machine learning and computing capability in recent years have created opportunities that were previously not cost effective. One such area is image recognition and computer vision, where a machine analyzes an image and classifies it. After classification, the machine can pass the information off to a different algorithm for decision making. Before a machine can classify parts of an image as a human does, it must break down the image in a process called image segmentation. This task is an open research area. Many algorithms exist to determine how pixels are grouped. This research poster details a validation study of related papers on image segmentation algorithms for machine learning. The first author has selected three different image segmentation approaches. Algorithms for this study will be reproduced in Python and utilize many pre-existing libraries. Our team has acquired a small robotic research platform to provide evaluation of our research. A Robot Operating System based robot will be assembled and tested with the three different algorithms to assess their real-world effectiveness. This study may lead to more research platforms. Additionally, this undergraduate research study opens opportunities for students to work with sophisticated code first-hand.

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 under grant no. NNX15AK02H OSGC.

Ren JianLee

University of Central Oklahoma

First-Person Perspective Tower Defense Game

The aim of this research project is to create a unique style of gameplay for traditional tower defense games. The project will attempt to include a first-person perspective into tower defense gameplay by allowing the player to control a character that can assist the turrets in eliminating waves of enemies. Two different camera views will need to be created for this purpose: first-person perspective for player-controlled shooting and third-person perspective for the turret building mode. Unity provides many helpful tools to accomplish this and will be utilized throughout the course of this project. The game will also include features such as wave spawns of enemies, a shop for turrets, and currency. The enemies will have set health values and movement speeds; the turrets will have set costs, fire rates, and damage values. The waves of enemies will increase in number as each round is completed. This project involves numerous scripts that provide various functions such as animating the bullet projectiles, camera movement, spawning of enemy waves, and waypoints that control the enemies' pathing. The player will be able to walk around the map and work together with the 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 newly acquired skill-set and a better understanding of game development using the tools provided by the Unity Engine.

Mathematics and Science.Computer Science.15

RadAlrifai

Northeastern State University

Drifting Simulator and Score Calculator

The Drifting Simulator and Score Calculator is designed to simulate data of a car drifting around a track and to calculate a score based on that data. In drifting, cars are modified to have very little rear wheel traction, allowing them to oversteer and slide around a corner at an angle. This program is designed to score drifters by how fast they take turns, how close they get to scoring pins, and at what angle they take the turns. The program is currently a basic, standalone program for demonstration purposes only. In the future the program could be implemented into hardware that could be attached to cars in order to get real-world information. The program is written entirely in Java as it is a flexible and easily portable language; the program is intended to run on different types of machines.

RadAlrifai

Northeastern State University

Stock Trading Emulator

The project's goal is to provide a platform to practice and learn more about stock trading in the form of a game. The stock emulator in its final form would work as a web application built into a server. For this project's scope, the application runs on a single machine within a web browser. Our stock emulator was built using Microsoft's ASP.NET platform with C# as the main programming language for the back-end processes, and the graphical user-interface was made with HTML and CSS. Our project is divided into two sections, the ASP.NET application that contains the front-end and all user interaction, and a separate C# program that is used to obtain the current stock data from the Alpha Vantage API and then store that data into a database. The data for the stock emulator is saved using a MySQL relational database that is accessed by the ASP.NET application and the C# back-end process. The MySQL database was set up on the development machine using XAMPP as an interface to install and manipulate the database.

AbigailKern, JichengFu

University of Central Oklahoma

Application of A Smart Phone's Built-In Barometer Sensor for Indoor Localization

The goal of our research was to determine if the built-in smart phone barometer sensor could be applied to indoor localization for determining which floor a person is on in a multi-story building. Since the barometer sensor reads pressure, and pressure changes based on elevation, our idea was that the readings should change drastically enough per floor to be able to determine which floor a person is on in a building. To achieve our goal, we created an android mobile app that saves raw data from the barometer sensor into a csv file, allowing for comparison between floor values later. To collect data, we used two different android phones and collected a large data set on three different floors in the same stairwell of a building. Then, we looked at the differences between each floor to see if the amounts were drastic enough for values to be unique to each floor. We observed the difference between consecutive floors to be 0.3 and 0.5 (hPa), which is a large enough difference to identify a floor. However, the two smart phones had data that differed by 5 hPa, and the base readings of each phone would vary by 12 hPa on different days. However, the actual difference between the floors was always between 0.3 and 0.5 (hPa). Therefore, the barometer can be used to determine which floor a smart phone, and thus a person is on. Future research needs to be done to determine the direct relationship of temperature and pressure readings, since pressure increases as temperature increases.

JacobHooper

Cameron University

Authentication Methods

Every day, people encounter some sort of authentication, whether it be logging into a computer using their username and password, unlocking their phone, entering their PIN to access a bank account, swiping a card for access to a building, and more. We are investigating the most reliable and secure methods of authentication by analyzing studies on the subjects. We present traditional methods such as passwords and PINs, as well as more recent technology, such as facial recognition, fingerprints, and more. We compare the different methods in multiple situations.

Mathematics and Science.Computer Science.20

ClintFerguson, SachetanTuladhar

Cameron University

DDOS: Prevention and Detection

Distributed denial-of-service is one of the most common and most highlighted attacks of today's cyberworld. With simple but extremely powerful attack mechanisms, it introduces an immense threat to our current Internet community. In our research, we present a comprehensive survey of distributed denial-of-service attack, mitigation techniques, and ways to prevent future attacks. We provide a systematic analysis of this type of attacks including motivations and evolution, analysis of each different attack methods, protection techniques and mitigation techniques, and possible limitations and challenges of existing research. Lastly, we highlight the future of Distributed denial-of-service attacks and ways to counter and defend against them.

MicheleTilley

Cameron University

Data Security in the Cloud

Cloud computing is a network of offsite servers hosted on the internet to store, manage, and process data. Cloud usage has become one of the most popular services used by many companies, as well as for personal use. With such a high volume of users, security has become a major issue in preventing the loss of data or stolen data. Some of the key aspects that must be accounted for when dealing with security are confidentiality, integrity, and availability. In this paper, we distinguish between the different types of security vulnerabilities and the threats that are associated with the security of data stored in cloud services. We also examine possible methods to enhance the security of data stored in the cloud.

Mathematics and Science.Computer Science.22

GregoryNorton

Cameron University

Social Media and Big Data

Big data is the colloquial term for information that is gathered into large data sets and then analyzed in order to determine patterns and trends. Big data utilizes various algorithms built around volume, velocity, and variety that are used by companies such as Cambridge Analytics and Google. Data is sourced from search engines, social media, stock exchanges, and black boxes like those seen in airplanes. Many industries such as governments, social media, health care, and finance analyze big data for their use. Our research will focus on the use of big data in social media marketing. Social media is an ingrained part of many people's lives and provides prime real estate for companies to find a target audience for their products. We will focus on algorithms used by companies advertising on social media and how they predict spending and browsing habits.

Mathematics and Science.Computer Science.23

JerallJones

Cameron University

Mathematics and Science.Computer Science.24

JerallJones

Cameron University

Virutal Reality in Medical Applications

Mathematics and Science.Computer Science.25

KeiTamura

Cameron University

Deep Learning in AI

Just as humans process a lot of information, machines and computers are now able to analyze, identify and distinguish various characteristics of objects, images, colors and patterns of words in a timely manner. This might take the form of completely new learning paradigms or continued refinement of existing principles. The objective of this research is to explain deep learning in artificial intelligence. Deep learning imitates the process of human thinking by analyzing complex data. Also, we present and compare the framework based on neural networks which is a system of hardware and/or software patterned after the operations of neurons in the human brain. Deep learning is applicable across various works of life i.e. commercial applications and in medical researches.

Mathematics and Science.Computer Science.26

Robert Arreola, Alex Berg, Jerall Jones and Dr. Jawad

Cameron University

Virtual Reality in medical applications

Virtual Reality technology has become increasingly effective in training and education, especially in the medical field. Using virtual reality, the medical profession has improved in the areas of medical treatment, recovery and patient awareness. This study outlines the framework and components used in medical training procedures, such as programming languages, software and hardware. We describe the use of the Unity software in a number of virtual reality applications. We present the use of virtual reality to decrease the cost of spatial co-registration of electrode positions with individual head models (EEG). We present a new method for building virtual assembly applications which is more efficient than traditional.

Mathematics and Science.Computer Science.27

CameronSmith

Cameron University

The Development and Applications of 3D Printing Technology

3D printing is a revolutionary new way to create objects that are first designed and modeled using 3D software before using a printing machine to create objects. Original development began as early as 1986 and has continued to grow and evolve since then. In our paper, we explore the creation, development, and future aspects of 3D printing. 3D printers can create a physical 3-dimensional object ranging from toys to prosthetic limbs. Many types of materials and printing methods are used depending on the intended use or purpose of the object. 3D printed objects are first modeled in a computer program that then converts that design into an STL file. This file is read by a machine that uses successive layers of material to create the final object. Additive manufacturing is widely used in the fields of biotechnology and many other fields. These applications continue to increase, and additive manufacturing is proving to be an exciting technology for the future.

Mathematics and Science.Computer Science.28

Mohammad AbdulBaset, JichengFu

University of Central Oklahoma

Indoor navigation for people with disability(Wheelchair)

Purpose: There are no better ways to navigate indoor areas. It is certainly a necessity for people with disability, specially wheelchair users. The purpose of this research is to develop an indoor navigation software which uses smartphone and machine learning to help users navigate indoor efficiently.

Relevant Research Context: There are some research work done for indoor navigation which uses magnetometer. It is more accurate than Wi-Fi and GPS and saves energy. My research mentor uses accelerometer for tracking wheelchair user's mobility for improving healthy life style of wheelchair users.

Description: First step, building a mobile application (currently using Android) that can collect accelerometer, gyroscope and magnetometer data.

Second step, based on those data, we will create segments about stationary, moving and turning. We will use those segments as training data for machine learning algorithms.

Third step, by using machine learning techniques, we will accurately determine a wheelchair's moving status.

Fourth step, we will use path finding for better user navigation.

Last step, we will combine wheelchair's moving status and path finding to determine the real time updating location of the user and instruct him accurately.

Conclusion: people with disabilities, especially wheelchair users, have hard time navigating in indoor areas. This application will help those people easily navigate indoors.

HaydenWebb, JeremyEvert

Southwestern Oklahoma State University

Adapting NASA's MAPSS Databases to Desktop Computing

The capability of desktop computers has increased greatly over the past several decades, even outpacing some of the first supercomputers. A standard Intel i7-4790 processor can run at 90 Gigaflops. This means it can complete almost ten to the tenth operations per second. Hence, in a time when you can buy a new 8th generation intel processor for a few hundred dollars, an older 4th generation intel processor is more powerful than the most powerful computer in the world in 1993. In this research, we examine code developed for a NASA supercomputer and run it on a standard personal computer. Our results suggest that for simple tasks, such as pulling down information from the servers, the software is capable of running on a standard desktop. This demonstrates that when NASA produced code is adapted to a modern desktop computer, the computer can process the given information. In summary, we can show that modern desktop computers not only have more processing power than some of the first supercomputers, but can easily handle applications attended for processing large sums of data. From a larger perspective, this shows how computers evolved to the point where what is considered an outdated processors is still leagues above what was first produced. This material is based upon work supported by the National Aeronautics and Space Administration under Grant No. NNX15AK02H NASA Oklahoma Space Grant Consortium.

Mathematics and Science.Computer Science.30

EzgiGursel

Southwestern Oklahoma State University

The Future of High Performance Computing at NASA

Computers are a growing part of everyday life in many ways.

For some of the biggest and most interesting problems, people have used some of the biggest and most interesting computers. This is the general area of High Performance Computing (HPC) or Supercomputing. Supercomputing has many uses in corporations and government organizations. One organization with a long and storied history with supercomputing is the National Aeronautics and Space Administration (NASA). The NASA Advanced Supercomputing Division has created or incorporated techniques and technology that has changed the course of supercomputing. The supercomputers at NASA have a variety of missions including weather forecasting and climate change predictions to helping astronauts at the International Space Station. As long as humans continue to explore and think of bigger questions, supercomputing will continue to grow.

This poster provides a literature review of documentation relating to current and past supercomputers at NASA, as well as a discussion of the future of supercomputing at NASA by looking at the trends in the current market. This material is based upon work supported by the National Aeronautics and Space Administration under Grant No. NNX15AK02H NASA Oklahoma Space Grant Consortium.

AlexandraCassidy, SamanthaCowan, JacksonEngland, MirandaWoodard, KamronFakhrshafaei

Southwestern Oklahoma State University

Is your shopping cart empty? Factors affecting expected enjoyment and purchase of video games

Overall males and females play video games in similar numbers (ESA, 2017) but play and prefer different games. The features of games that appeal to different gamers are relatively unexplored. Females report preferring fantasy based games and female gamers rate the availability of a female protagonist as a play option very important in their game experience. It is also well documented that video game covers often depict sexualized females (Lynch et al, 2017). We explored the effect of genre, gender of character on cover, and sexualization of cover character on ratings of expected enjoyment for self and others. Participants viewed a series of covers that varied on these variables and rated for how much they thought others who varied by age (college, high school, middle school) and gender would enjoy the game.

Mathematics and Science.Computer Science.32

UPAMANEUPANE

Cameron University

Pricing European and American Options Using Numerical Methods

This article introduces numerical methods for pricing both European and American options governed by the Black-Scholes equation. After a careful treatment on boundary conditions, we use explicit, implicit, and Crank-Nicolson schemes for numerical solutions to the resulting problem. We present a computational algorithm and display numerical results. We estimate the relative error in L1 norm to test the accuracy of the schemes.

MirandaBabb

University of Central Oklahoma

High School Outreach with Mobile App Programming

The objective of our research is to promote interest in Computer Science (CS) among high school students, specifically female students, students of minor ethnic diversities, and students from rural schools or schools that do not provide programming in their CS courses. Our approach resulted in the development of coding workshops to teach beginning programming concepts while also introducing several applications of programming in the working world. This project, dubbed Code Okie: One Line at a Time, has since used the drag-and-drop programming environment Scratch to introduce beginning programming concepts at the start of our workshops. Due to positive responses to Scratch from students who attended these workshops, we believe that App Inventor, another drag-and-drop programming environment but on mobile app platform, can be used to generate more interest in CS among high school students, especially in returning students. Previous studies have taken a similar approach of utilizing Scratch and App Inventor, in some cases both, to increase interest in CS and motivate students to study CS related disciplines. Our study is unique in that it relies on self-taught, undergraduate instructors to teach high school students programming concepts. This workshop also differs in that it consists in several platforms, in which App Inventor will serve as an introduction to Python programming with Raspberry Pi and Robotics. Currently, we are developing projects that also promote math concepts.

Mathematics and Science.Computer Science.34

PatrickParizek

University of Central Oklahoma

Space Miner

Space Miner is a 2D Java game made in the Object Oriented Programming class at UCO. The goal of the game is to move a spaceship up and down and fire missiles at enemy ships and "space rocks" to earn points. The idea is that the player is mining the rocks for minerals and earning points based on the value of the minerals. Black rocks score 10 points, silver rocks score 25 points, and gold rocks score 50 points. Hitting an enemy ship scores 1 point. The player must avoid direct contact with the rocks as well as the enemy ship's missiles, which are fired any time the player fires missiles. The player also has a limited number of special items: shields, which absorb damage and heal the player, and special missiles, which can be fired in any direction and are not detected by the enemy ship.

SilaTamang

University of Central Oklahoma

Network Server Connection using Raspberry Pi to compute the dust level

Internet of things, the advancement in computing devices and web services, the notion to make a network of wireless sensors has enabled us to connect, interact and exchange data. In our study, we quantify the residue level through dust sensors with the utilization of Raspberry Pi(RPi). We conjecture various places even in UCO campus would carry different levels of dust collection. The purpose is to compute data from these places and display the result through Network sever while tinkering with (RPi). The framework of this system includes sensor web nodes using RPi, dust sensors for the analyzation of dust levels, Wi-Fi for the data communication between web node and server and the utilization of MySQL database for the storage of the data gathered. The framework is considered as minimal effort and exceptionally versatile both as far as sensors and the number of sensor hubs, which makes it appropriate for a wide assortment of utilizations identified with natural observing. The plan eventually is to display the data with the visualization software which shows the significant dust level of various places.

Mathematics and Science.Computer Science.36

RashedAlrashed

University of Central Oklahoma

Leibstien

Leibstien is a shooting game in which the player uses weapons to shoot at enemies. One weapon shoots fast with small bullets, while the other shoots a large and slow missile that explodes at the target. Enemies hide behind walls for cover while shooting at the player, and if the player destroys the cover, the enemy looks for another cover, if available, to protect themselves. Featuring multiple levels and using Java as programming language with object oriented programming concepts to develop the game.

Mathematics and Science.Computer Science.37

HaganHolsapple, JeremyEvert

Southwestern Oklahoma State University

Penetration Testing using a Raspberry Pi

The problem for companies is that they are constantly being attacked by hackers, some companies actually lose sensitive information. This can lead to identity theft, compromised bank accounts and other problems for companies. In order to ensure this situation is avoided, penetration testing has become a enormous opportunity for companies to find exploits within their own software. The goal of this research is to show how easy it is to use an inexpensive Raspberry Pi for penetration testing for beginners as well as experts looking for alternative methods. By researching the book Penetration Testing with Raspberry Pi by Michael McPhee and Jason Beltrame, I want to show the benefits of using this software and how to perform this type of test in order to inform those who are interested and looking for an inexpensive way to practice cyber defense.

Mathematics and Science.Criminal Justice.01

VelmaCarriaga

Southwestern Oklahoma State University

Oklahoma Indian Country

In August 1999, Patrick Murphy, a Muscogee (Creek) Nation tribal member murdered George Jacobs, also a member of the Muscogee (Creek) Nation tribe. Murphy was subsequently tried and convicted of murder in Oklahoma state court and sentenced to death.

United States Court of Appeals for the Tenth Circuit reversed the verdict, holding that since the crime occurred on the Creek Reservation, the State of Oklahoma lacked jurisdiction. The Court further ruled that Congress had in fact never disestablished the Creek Reservation.

The presentation “Oklahoma Indian Country” will examine *Carpenter v. Murphy* and will exhibit research on historical precedent regarding jurisdiction over tribal members and tribal lands. The presentation will also examine issues such as: did Congress ever disestablish and/or diminish the Creek Reservation? If the Creek Reservation is found to be intact under the 1866 treaty with the United States, what implications will such a verdict hold for the 1.8 million residents and the eastern half of the State of Oklahoma?

On November 27, 2018, oral arguments were heard by the United States Supreme Court; the case is now pending.

Mathematics and Science.Criminal Justice.02

VelmaCarriaga

Southwestern Oklahoma State University

Oklahoma Indian Country

In August 1999, Patrick Murphy, a Muscogee (Creek) Nation tribal member murdered George Jacobs, also a member of the Muscogee (Creek) Nation tribe. Murphy was subsequently tried and convicted of murder in Oklahoma state court and sentenced to death.

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Mathematics and Science.Criminal Justice.03

VelmaCarriaga

Southwestern Oklahoma State University

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Mathematics and Science.Criminal Justice.04

JesusManzano

Southwestern Oklahoma State University

War on Drugs: Friend or Foe?

This poster goes over ramifications that the War on Drugs has had in the United States, particularly, its inflicted racial bias, the militarization of police, and the violation of civil rights.

Mathematics and Science.Criminal Justice.05

RikkiTasso-Thompson

Cameron University

Bridging The Gap of law Enforcement and Our Public

"What causes the strain?"

Changing View of Law Enforcement through the General Public Eyes

After attending this presentation attendees will learn about the tensions that have arisen in the United States concerning the behavior of police officers and on-site Forensic teams that have raised many questions; whether the media portrays the incident correctly , whether the incident was justified , and, whether race relations was a factor .

In order to get an idea of the public's current perception of law enforcement and forensic personnel and if the portrayed view of such personnel has a mental effect on them, we designed a survey of questions utilizing a quantitative study, specifically focused on how the general public feels about the nature of our forensic personnel in this country . The survey was accompanied by a public forum consisting of three law enforcement officers who have each been involved in a deadly use-of-force situation. During the forum, these officers each gave a detailed account of the situation, as well as how the situation impacted their lives, both professionally and personally. In an extension of this research, we are studying the effects of social media-induced protests.

Mathematics and Science.Criminal Justice.07

SummerGraham

Southwestern Oklahoma State University

Feminist Criminology

A poster depicting the influences of criminology from feminist thought. Areas covered included are career statistics by gender, crime by gender, and female contributions in the field. Feminist thought as a movement and feminist school of criminology history is less than 100 years old. All research and knowledge that exists from before are based upon the males that commit crime. This poster goal is to educated and show the gender differences in the field of criminology.

Mathematics and Science.Criminal Justice.08

DianaClayton, SarahChase

Rogers State University

Does discretion within criminal court adjudication compromise equal justice for all?

The Oklahoma Constitution assures "[t]he courts of justice shall be open to every person . . . right and justice shall be administered without sale, denial, delay or prejudice." Okla. Const. Art.2, Sect. 6. All forms of law establish substantive and procedural mandates within the criminal justice system to ensure uniform decision-making and a just outcome. Yet, discretion is exercised at every stage of the criminal justice system: to arrest or not, to file or not file charges, what charge(s) to file and whether to make a plea offer; to grant bail, continuances, admit evidence, and applicability of law are but of a few of the decisions made by law enforcement, prosecutors and judges reviewed primarily by an abuse of discretion. Reconciling the quest for uniformity against the backdrop of discretionary authority appears to render an oxymoronic outcome. This inquiry examines twelve months of criminal court cases for uniformity, statutory compliance and the lawful exercise of discretion.

Mathematics and Science.Criminal Justice.09

DianaClayton

Rogers State University

Does discretion within criminal court adjudication compromise equal justice for all?

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Mathematics and Science.Criminal Justice.10

DianaClayton

Rogers State University

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Mathematics and Science.Engineering.01

YuhaoJiang

University of Central Oklahoma

MR Image Evaluation using Perception Models

Magnetic Resonance Imaging (MRI) is a fast developing image modality. It is advantageous to other imaging methods from many sides such as radiation-free, excellent soft tissue contrast, and etc. Human perception model, which includes human visual system properties, can provide quantitative values for the assessment of image quality. In this study, we developed a more advanced and specialized computational human perception model to assess magnetic resonance images. This model is based on the idea to associate the perceptual difference model (PDM) and detection models. A modified PDM channel structure was implemented in the detection model. A detectability value was determined by the detection model. The model can quantitatively evaluate image quality with the improved accuracy. We anticipate that the proposed model can not only use detection of a low contrast lesion as a measure of image quality, but apply to other circumstances where detection is an inadequate measure such as interventional MRI and fast MR imaging.

Mathematics and Science.Engineering.02

JosephPuskas, MelvilleVaughan

University of Central Oklahoma

Modeling and Simulation of Pipeline Embolization Devices Effects on Fluid Flow into an Aneurysm

This research demonstrates the effects of various Pipeline Embolization Device (PED) designs on the blood flowing into an aneurysm. PEDs are used to reduce blood flow into an aneurysm and therefore allow for the blood vessel to heal. Finding optimal designs for the pores in a PED could help improve aneurysm treatments. In order to carry out this research 3-D models of blood vessels were made with the PED designs inside of them and then numerically modeled in COMSOL. The blood vessel model has a diameter of 4 millimeters, a side branch with a diameter of 1.5 millimeters, and an aneurysm with a height of 15 millimeters. These dimensions were taken from a real patient's aneurysm. The simulations were run using physiologically realistic pulsating pressure and velocity boundary conditions ranging from 80 to 120 mmhg and from 0.2 to 0.56 meters per second respectively. The results of each simulation are able to be directly compared to each other because the only variable changed between the simulations was the size of the pores in the PED design. The effectiveness of different stent pore sizes was obtained by comparing the flow profiles, velocities, and shear stresses inside of the aneurysm for each of the different PED designs. The results of this study show a linear change in the velocity of blood inside of the aneurysm as the size of the holes decreases. These simulations are the first step in determining an optimal design of PEDs for reducing blood flow into an aneurysm.

Effect of immobilization of fibronectin and collagen on the cellular functions of poly- ϵ -caprolactone

Fibronectin (FN) contains several active sites, known as the heparin-binding domains, collagen-binding domain, fibrin-binding domain, and cell-binding domain, that serve as platforms for cell anchorage. [1] The goal of this study was to evaluate the effect of immobilization of collagen and plasma fibronectin with polycaprolactone (PCL) nanofiber membrane (NFM) on the cellular functions of PCL NFM. The results (Fig. 1c and Fig. 1d) show that the individual immobilization of CG and FN on PCL NFM has no adverse effect on osteoblast cell adhesion and proliferation of PCL NFM, although a significant increase of cell adhesion was observed for FN-PCL-NFM when compared to PCL NFM ($p < 0.05$). A significant improvement of cell adhesion and proliferation was observed for FN-CG-PCL NFM in comparison to PCL NFM ($p < 0.01$). This is due to the fact that higher cell functions were created via better cell signaling arising from the cell-cell contact and the cell-NFM components in the case of FN-CG immobilized PCL NFM compared to PCL NFM.

ErinDrewke, GangXu

University of Central Oklahoma

Biomechanical Characterization of Engineered Dermal-Equivalent Tissue

The purpose of this study is to probe and quantify the mechanical tension generated in the fibroblast-populated collagen lattices. In this study, we created tension-maintaining dermal equivalents by co-culturing human dermal fibroblasts with type-I collagens in relative low, medium and high concentrations. Polymerized collagen lattices were supported structurally by plastic mesh rings. TGF- β 1 was added to some 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. We found that the circular wound area expanded more quickly the lower the collagen concentration in the lattices, and more slowly the higher the collagen concentration, suggesting that there is considerable level of mechanical tensions in the collagen lattices. In addition, the induced wounds in TGF- β 1 treated lattices showed quicker and larger expansion than the control, which indicates more tension generated in the presence of TGF- β 1. The results would indicate that higher collagen concentration impedes the tension generation in the tissues.

Mathematics and Science.Engineering.05

RanjanSinghal

Oklahoma State University

Synthesis of Two-Dimensional Hexagonal Boron Nitride by Chemical Vapor Deposition

Two-dimensional hexagonal boron nitride (2D hBN) is a single - atom thick layer (monolayer) of alternating boron and nitrogen atoms, which is of great interest and potential due to its excellent electrical, optical, and mechanical properties and isostructural to graphene. In order to fully utilize the potential of 2D hBN, wide area processing of high quality 2D hBN is of utmost importance. As of now, chemical vapor deposition (CVD) is the most promising method to synthesize 2D hBN because it provides great control on the thickness of deposited films (number of layers) and is the best candidate for industrial scale-up processes. Therefore, a CVD system was designed for synthesis of two-dimensional hexagonal boron nitride with low (UHV, LPCVD) and atmospheric pressure (APCVD) operation capabilities and solid and liquid precursor delivery system. This customized CVD system is also capable of synthesizing other 2D materials like graphene and molybdenum disulfide since it can incorporate different types of precursors and reaction gases. This presentation reviews the state-of-the-art research on 2D materials, especially for hBN and explores the CVD aspects of hBN synthesis with a specific focus on the designed CVD reactor system and its components. Preliminary results on the synthesis of 2D hBN will also be presented.

Biocompatibility and Biodegradation Analysis for a Flow Diverter

Fine-meshed flow diverters have become a promising and efficient endovascular treatment to cure aneurysm by controlling blood flow into the aneurysm. These fine-meshed flow diverters are made from micrometer scale metallic wire. However recent report shows that permanent placement of metallic wire is a source of late thrombosis, stentosis and other delayed vascular complications. A fine-meshed flow diverters based on a biomaterial that would reduce those risks by completely absorbed by the body. The objective of this research is to evaluate and study biological properties, biocompatibility, and biodegradation of two candidate polymers; polylactic acid (PLA, a thermopolymer), and a photopolymer. Flow diverters made from PLA and a photopolymer were tested with multiple cellular experiments for compatibility and evaluated the degradation rate. Human dermal fibroblasts cells were used to quantify cell performance such as proliferation, differentiation, and adhesion on the flow diverters. Results show that cell growth, proliferation, differentiation, and adhesion are positive compared to a control in cell culture dish without flow diverters. For degradation study, both flow diverters were soaked in a phosphate buffer solution over 2,4, and 6 week periods. The degradation rate of photopolymer was found to be 1.8% for 2 weeks, 6% for 4 weeks, and 8% for 6 weeks. These results shows that the candidate material can be used for making fine-meshed flow diverters for aneurysm treatment.

AliciaJohn

University of Central Oklahoma

Melt Electrospun 3D Scaffold

Melt electrospinning is a processing technique to produce fibers and fibrous structures from polymer melts in the range of nanometers to few micrometers. This advanced technique is used to design and build pre-determined porous scaffolds, which depends on the instrument parameters and solvent properties: fiber diameter, uniformity of the fibers, solution viscosity, flow rate, tip to collector distance, ambient parameters. The main limitations of the regular electrospinning process lies in the fiber diameter in the undesired range and formation of beads or pores in the structure due to the solution viscosity, making fibers non-uniform. My research is to develop a modified melt electrospinning system using Newport actuators for controlling the scaffolds in the three dimensions within the range of ten microns. Selecting a suitable biocompatible, biodegradable chemical solution, also determines the feasibility of the system. Different solutions such as Calcium Phosphate cement (CPC), Polycaprolactone (PCL) with acetone were tried with various concentrations, the viscosity of the experimental solutions were tested using the Bohlin Rheometer. Arduino programmed stepper motor syringe pump system is used to control the ejection of fluid to maintain constant flow rate, preventing the formation of any non-uniformities. The whole system is enclosed for optimal performance of the UV light, accelerating the normal curing time of the solution.

Mathematics and Science.Engineering.08

AshleaSartin

Oklahoma State University

Mathematical Modeling of Mesangial Matrix Expansion in Diabetic Kidney Disease - Ashlea Sartin and Ashlee N. Ford Versypt

Diabetes is the leading cause of kidney disease. About 1 out of 4 adults with diabetes has kidney disease. The kidney is supposed to filter wastes and extra water out of the blood stream to produce urine. When the kidney is damaged, it cannot filter blood like it should, which leads to waste build up and excess water in the body and eventually to death. One of the key cell types damaged in the kidney is mesangial cells. Experiments have shown multiple chemical pathways that change mesangial cells in diabetic kidney disease (DKD). It is challenging to describe how these chemical pathways interact with each other in mesangial cells over time. I have used mathematical modeling of differential equations to represent the chemical pathways in mesangial cells that are known to be affected by DKD. I have combined the separate pathways into a comprehensive systems biology model that can consider the interactions between pathways and between multiple mesangial cells in the kidney filtration barrier. I will present model results for conditions that lead to expansion of the mesangial tissue (cells and extracellular proteins) during diabetic hyperglycemia.

Mathematical Modeling of Nephrin Loss in Diabetic Kidney Disease

Diabetic kidney disease is the leading cause of kidney failure. The job of the kidneys is to filter the blood. However, when the kidneys are damaged, the filtration system is less efficient. The kidney has many different cells and areas. In this project we focused on podocyte cells, which compose the outer filtration barrier. In between podocyte cells, a protein called nephrin connects the podocytes like Velcro. The blood is filtered through this area to excrete waste and excess water. Diabetes can cause the nephrin to lose its Velcro abilities causing it to disconnect from the podocyte cells and be excreted in the urine. The loss of nephrin causes the mountain and valley landscape of the podocytes and the gaps between them to become distorted. The damaged filtration system allows not only the waste materials to be removed but excess proteins are excreted into the urine. Diabetic complications can cause the nephrin to lose the Velcro ability and be excreted. We will present an empirical model for predicting category of proteinuria (protein in the urine) based on loss on nephrin expression using human biopsy data for Type 2 Diabetes patients. The model relates the % of nephrin lost to the mRNA of nephrin and the urinary protein concentration. This noninvasive modeling research provides quantitative guidance for the threshold where nephrin loss causes long-term damage to the kidney clinically detectable by the presence of protein in the urine.

Mathematics and Science.Engineering.10

Ka HeiChan

University of Central Oklahoma

In-car Life Detector

This paper studies about building a device that saves human-being who is trapped in a car with methods of calculating life indicators, and signal analysis, and Internet of Things (IoT).

Written by Ka Hei Samuel Chan and Dr. Nesreen Alsbou.

Human-Powered Desalination Unit

The objective of this research is to design a human-powered desalination unit that can provide safe drinking water for a typical household in developing countries. Currently more than 800,000 children younger than 5 years die every year from diarrhea diseases, which are mainly (>80%) caused by unsafe drinking water and lack of sanitation. The hypothesis of our study is that a human-powered machine operating on a Mechanical Vapor Compression (MVC) cycle can provide economically- and technologically-affordable drinking water without the use of expensive RO membranes. Thermodynamic analysis for human-powered MVC cycle with minimized pressure difference, and small surface area is conducted. The design space included the following limitations: (i) only one compressor and only pump could be used, (ii) evaporation mass ratio was less than 0.7, and (iii) the water had to reach the minimum temperature required to inactivate bacteria, viruses, and protozoa. The effects of the concentration of salt in the waste brine were considered. The flow rate of clean water generated was calculated as a function of the required heat exchanger surface area; the primary cost factor in the design; as well as the compressor isentropic efficiency. The point of maximum efficiency in term of mass flow rate per unit surface area was calculated.

Mathematics and Science.Engineering.12

EileenHernandez

University of Central Oklahoma

Determining the optimal parameter to produce Nano-fiber on a drum collector

The goal of my research is to produce a nanofiber plot using a rotary drum. Unlike normal fibers, nanofibers are fibrous, light weighted with a diameter of 100 nanometers or less. It is produced by combining a polymer such as Polycaprolactone (PCL) and a solvent like acetone. There's different ways to collect fiber, however the process we use is called the electrospinning method. It consists on using electric charge to attract threads of the polymer solution. For my project, I will be using a syringe's needle and a metal rotating drum to serve as charging ends where the electrospinning method will take place. The variations of the nanofiber are affected by the rotations of the drum, the flow and release of the polymer substance and the distance between the needle and the drum. The syringe is controlled by a syringe pump which is programed to push at a specific rate. The optimal parameters consist on having perfect alignments of the fibers in a parallel pattern. Once the PCL fiber is produced, we collect it from the drum, and observe it through the Scanning Electron Microscope (SEM). The overall outcome of my project is to built a custom made system that adapts to the production of a desired pattern of nanofiber.

Crack Healing in Glass and Glass - Ceramic Composite for Solid Oxide Fuel Cells

Demand for energy consumption is ever increasing. The rapid urbanization has facilitated access to power and transportation to a vast majority of population. To maintain current demand and fulfill the future need alternative methods of power generation with highest efficiency is necessary to avoid negative impact of excessive use of fossil fuels. One such alternative technology is solid oxide fuel cell (SOFC). However, one of the major limitations in the development of solid oxide fuel cell's long term operation, under thermal cycle and high stack load, is the fabrication of a stable sealant which can maintain the hermeticity of the stack and avoid electrical shorting of the cell component. Sealant made out of glass are preferred since it offers inertness, ability to tailor the coefficient of thermal expansion (CTE) to match with other cell components, interfacial stability, high electrical resistance and wettability with the adjoining surface to maintain the stacks hermeticity over a prolonged operation. However, glass and glass ceramics are susceptible to cracking due to their brittle nature when the fuel cell is under thermal transient or even due to slight CTE mismatch with other cell components. This issue can be addressed if the glass maintains its vitreous property thereby facilitating crack healing at cell operating temperature. The effect of temperature, time and composition on crack healing kinetics in glass and glass-ceramics will be discussed and presented.

Robust Lithium Ion Batteries for Electric Vehicle

With their high energy density, long cycle life and variable charge–discharge rates, rechargeable Li-ion batteries are preferred to power electric vehicles by car manufacturers. However, the use of liquid electrolyte in these batteries can lead to fires and limit the performance due low thermal stability, decomposition and formation of dendrites leading to shorting. These issues are addressed by using solid state electrolyte in addition to improving safety and durability. The most studied and promising solid state electrolyte is Garnet-type $\text{Li}_7\text{La}_3\text{Zr}_2\text{O}_{12}$ (LLZO). Current challenges faced by an all-solid-state electrolyte are optimum processing conditions to achieve high density, doping and understanding the nature of interface formed between solid electrolyte and the electrodes. The state-of-art developments in the solid electrolyte along with preliminary results in processing of electrolyte will be discussed and presented.

Mathematics and Science.Engineering.15

AninditaDas, kylelevy

University of Central Oklahoma

Smart Cities Design of an Intelligent Network Using Existing ODOT ITS Technological Infrastructure on Current Oklahoma City Metro Highway.

Highway travel is a constant that is present in the daily lives of a vast majority of the public. Active measures have been developed and are on-going in order to improve the safety of the driving public. Vehicle to Vehicle (V2V) communication has been developed for the use in these active measures. The Oklahoma Department of Transportation has developed a system using V2V for real time data collection. The V2V system can be used in conjunction with smart and or self-driving vehicles. The vehicles have enclosed sensor systems that act to either take action to avoid a potential collision or warn the drivers to take the actions on their own. A prototype will be built to allow us to simulate driving scenarios on a highway and various algorithms for the collision avoidance. This will be accomplished by following the four deliverables: (1) design and implementation of sensor system, (2) analyze and design algorithms for collision avoidance, (3) analyze and implement data transmittal protocols for wireless communication, and (4) generate simulation of vehicle to vehicle network on a real highway system.

KhaledSallam, MuhammadRaza

Oklahoma State University

Eliminating Spray Drift of Flat Fan Nozzle

The objective of this research project is to eliminate the spray drift caused by crosswind. Spray drift is an important problem for the agricultural industry. Some herbicides (e.g. Dicamba) can cause serious damage if it drifts to nearby crops that are not genetically modified to withstand those herbicides. Our hypothesis is that the nozzle geometry and the injection angle can be actively/passively controlled to compensate for the crosswind. The present experimental setup consists of a commercial spray injection system with three different nozzles. The spray can be injected at different angles in the test section of a subsonic wind tunnel with a maximum air velocity of 60 m/s. The instrumentation consists of a pitot-static tube and an inclined manometer to measure the air velocity in the wind tunnel, a back-light illumination system, and a high-resolution camera. The spray images were analyzed using ImageJ software. The measurements include the breakup regime transitions, the droplet sizes, and the droplets trajectory as a function of the wind speed and the injection angle. The current results show that the crosswind modifies the primary breakup mechanism from sheet breakup regime (i.e. thinning and fragmentation of the liquid sheet into ligaments) to bag breakup regime (i.e. the formation bags along the downstream side of the liquid sheet) resulting in smaller drop sizes and an increased drift flux. Techniques to eliminate the bag breakup regime are presented.

CarlosPalou

University of Central Oklahoma

Platelet Activation Mechanism in Microchannel Networks

Activation of platelet is the primary response to the scar or inflammation of blood vessel and trigger clotting, thrombus formation and other repairing mechanism. However vascular abnormality such as stenosis can cause uncontrolled activation cause various vascular diseases. The objective of this research is to determine correlation platelet activation with various fluid dynamic parameters and thrombus formation in microchannel network. PDMS microchannel network with different width and depth was fabricated using photolithographic process and plasma bonding. Microchannel network mimic Willis circle and various flow conditions including steady and time dependent pulsating flow were investigated. Platelets was flown through the microchannel network loop for 10 min and collected. Platelet activation was quantified by measuring P-selectin expression through FITC-anti-P-selecting and a flow cytometer. The results show that higher flow rate and abrupt changes in vessel diameter leads to an activation in platelets. The abrupt changes in vessel diameter causes vortices in flow, higher shear rate and wall shear stress. This results provide insight on platelet activation and thrombus formation in microvessel such as deep vein thrombosis.

Mathematics and Science.Engineering.18

MohamedAfify, MohamadKeblawi

University of Central Oklahoma

Smart Semi-Truck Health Monitoring & Safety System

It's estimated that there are around 500,000 fatal accidents every year in the US. Most of these accidents are due to the lack of the safety system that is built in the trucks. Also the driver health is important as he travels for many hours and any health issue can cause a fatal death. We are designing a system to enhance the safety system in the truck and a health monitoring system to check the driver health periodically and send a report if there is any danger will affect the driver. we are implementing a blind spot system and LIDAR system to detect the obstacles and alert the driver. We also are installing a system that can detect the sudden braking of the vehicle in front of the truck and warn the driver a few seconds before the accident. We are designing a medical monitoring system inside the truck to give readings of the driver health conditions to prevent accidents as heart attacks or the driver falling in sleep.

Mechanical Characterization and In-silico Flow Analysis of a Flow Diverter

Flow diverters have become an efficient and promising endovascular strategy for treatment of aneurysm. However mismatch in flow diverters' mechanical properties with aneurysm morphologies can cause restenosis, late thrombosis, rupture of aneurysm and other vascular complications. The objective of this research is to develop functional relationship among mechanical properties of flow diverters, aneurysm morphologies and fluid dynamic parameters using silicon model. A transparent PDMS carotid artery model of 5.0-5.92 mm in diameter with varying sizes aneurysm (10 mm & 25 mm) was developed using lost sucrose casting method. Flow diverters were fabricated from metallic and polymer wire. The three main mechanical tests of flow diverter were three-point bend test using the expansion and compression testing machine with specially constructed metal holder. The radial and longitudinal tensile test using the Universal Testing Machine (UTM). Fluid tests using a micro-PIV were conducted to measure the velocity and the wall shear stress of a PED. The tests were specifically chosen to replicate the performance of the PED inside a living blood vessel. The results show that flexible, higher pore density and lower pore sizes can block the fluid into the aneurysm by 80%. These results can help better understand and use flow diverters for aneurysm treatment.

Modeling and Simulation of the Vessel Network Hemodynamics

The knowledge of various hemodynamic factors in blood vessels is important for understanding mechanics, states and treatment of various vascular diseases. The objective of this research is to find the change of hemodynamic parameters for various vascular network and flow conditions. Finite-element based multiphysics software COMSOL 5.2a was used to solve Navier Stokes equation with pulsating pressure conditions in bifurcation and tortuous vessel networks. The various vessel diameters were used to accommodate the changes of diameter at different ages. The arterial wall stress, shear rate, velocity profile at the junctions, vorticity and circulation rate were calculated. The results show that microcirculation and vortices can generate even in a low velocity due in tortuous vessel and junctions where multiple vessels meet. The arterial wall shear stress and shear rate follow the pattern of pulsating pressure conditions. However, in furthest and narrow vessel from the boundary the pulsating nature become weaker. This finding will help better understanding the vascular diseases.

KevinHaggard

University of Central Oklahoma

Design, Development, and Characterization of a Pipeline Embolization Device

Pipeline embolization devices (PED's) are used to restrict blood flow to an aneurysm, thus receding the aneurysm until it has disappeared. This research demonstrates the design, development, and characterization of a biodegradable, and biocompatible pipeline embolization device for use in the carotid artery. Experimentation was done with polylactic acid, and a photopolymer to determine a suitable construction material for the PED. To confirm polymers chosen for the device are biocompatible and biodegradable, the materials are tested with multiple cellular experiments for compatibility and tested chemically for the degradation rate. Degradation rates were tested for both materials by soaking them in a phosphate buffer solution over 2,4, and 6 weeks periods; and low degradation rate was observed. Designs of the PED models were built with SOLIDWORKS; and fabricated using rapid prototyping. To find the optimal PED design, COMSOL Multiphysics; was used to simulate physiologically realistic pulsating pressure and velocity. The effectiveness was determined by the flow profiles, velocities, and shear stresses inside of an aneurysm. Mechanical testing on the PED included three-point bend test, radial test, tensile test, and ex vivo physical simulations, which were carried out by constructing an artificial artery composed of polydimethylsiloxane (PDMS). The results show that designed PED can effectively reduce fluid flow in the PDMS aneurysmal sac.

POSS-based Fiber Carbon-Fiber Surface Treatment for Enhanced Durability of Composites

In the proposed study, we synthesize a clickable polyhedral oligomeric silsesquioxane (POSS) carbon fiber coating to enhance the fiber-matrix interfacial properties using the highly selective "thiol-ene click" chemistry. The unique hybrid structure of POSS molecules creates a spring-like effect when strongly bound to a surface, resulting in a smooth load transfer across the interphase region, making it uniquely suited for use as a fiber surface treatment to develop damage-tolerant composite laminates. This is the first study to date that reports on the use of "thiol-ene click" chemistry to create a controlled POSS coating to enhance the interfacial properties between the fiber and matrix. Thiol-ene chemistry is the reaction between a thiol (-SH) group and alkene group, creating a bond between the two materials. PAN-based carbon fibers undergo a series of chemical modification resulting in thiolated-carbon fibers. Octavinyl-POSS is selectively "clicked" to the carbon fiber surface, creating a strongly bound uniform POSS coating. These POSS-coated carbon fibers can now be used as a prepreg for the manufacturing of composites for aerospace applications requiring enhanced composite strength and durability. The fiber-matrix adhesion is characterized using fragmentation tests to determine the interfacial shear strength. Meanwhile, the surface treatment chemistry is characterized using FTIR and XPS techniques.

LibinK. Babu

Oklahoma State University

Combined Experimental and FEA Based Investigation of Near Fiber Effect of UV Exposure in Carbon Fiber Reinforced Composites.

Characterization of the interphase region in carbon fiber reinforced polymer (CFRP) is challenging because of the length scale involved and the lack of analytical solutions that account for the fiber constraint effect. An integrated approach involving Atomic Force Microscope (AFM)-based indentation and Finite Element (FE) modeling is used to determine the extent of fiber constraint effect on the properties determined in the interphase region. A gradient was observed in the elastic modulus of the interphase evaluated along a radial line from the fiber, based on which the width of interphase is determined to be 250 μm . The 3D FE simulations indicate that fiber constraint impacts interphase modulus only within 40 μm of radial distance from the fiber while using AFM tip. Nonetheless, the apparent increase in interphase modulus is significantly less as compared to the overall gradient in the modulus value of the region, as determined by AFM indentation. Hence, these results confirm that the behavior of interphase is distinct compared to the bulk material. Similar results were observed for viscoelastic response of the interphase region. This approach is further utilized to evaluate the impact of Ultra-Violet (UV) irradiation on the modulus value of the interphase region as a function of exposed time and radial distance from the fiber. This study demonstrates that the response of epoxy to

Computer simulation of laser parameters in microfabrication

Laser micromachining technology offers a promising alternative fabrication method for mass production of microfluidic channels. In this study, we performed a systematic investigation to understand the effect of various laser parameters and thermophysical properties of microfluidic substrate material (Poly(methyl methacrylate) (PMMA)) in laser micromachining. A three dimensional transient energy equation was solved using finite element method where laser induction was represented as a moving heat source with Gaussian profile. The convergence and grid independence studies were performed for the developed model. The simulation results show that the profile of the channel and cut depth are the complex function of laser parameters such as laser beam radius, laser power and moving speed as well as thermo-physical properties of the substrate such thermal conductivity, density and specific heat. For a specific laser beam radius which depends on the distance between laser tip and the target substrate, the laser power and cut depth has linear relation. Larger beam radius create wider profile with lower cut depth. However the relation between the laser beam radiuses with cut depth are not linear. The higher convective heat transfer coefficient creates lower cut depth and smoother surface in the channel. The effect of specific heat does not have significant effect on the laser machining. This study will help in selecting optimum parameters for mass fabrication of microchannels.

Laser micromachining of microchannels on various microfluidic substrates

Recent years, laser micromachining has become a promising technology for mass production of microfluidic channels in various polymeric substrates. However excessive roughness of channel surface, lack of control of process parameters and nonuniformity of channel geometry are the ongoing challenges. In this research, we studied the effect of laser system parameters on the channel characteristics. A commercial MUSE laser system was used for machining of three widely used microfluidic substrate to create microfluidic channels. Muse Full Spectrum laser system consists of a 45W laser tube with three degree of freedom (lateral, longitudinal and vertical). Three laser system parameters - speed, power, focal distance and number of passes are varied to fabricate straight microchannel on glass, PDMS and PMMA. The results show that higher speed produces lower depth while higher laser power produces deeper channel regardless of the substrate materials. However for same speed and power, PDMS channel had the roughest surface and PMMA had smoother surface. On the other hand, number of passes produces uniform and wider channel on the PMMA. Out of focus laser cut produces wider but shallower channel. In higher power and slower speed, glass breaks. The results also show that slight heat treatment can reduce surface roughness. This comprehensive experimental investigation can provide guidance for the substrate material based mass production of microchannels.

Mathematics and Science.Environmental Science.01

DineeshaPremathilake

University of Central Oklahoma

Does intraguild avoidance occur in mesocarnivores? Temporal activity pattern analysis of mesocarnivores in southcentral Oklahoma

Camera trapping has been increasingly used to monitor different ecological aspects of wildlife, specifically for elusive, large carnivores. Relatively few studies have been conducted on temporal activity overlap between mesocarnivore species using camera-traps, and no such studies have been done in Oklahoma. My study was conducted at Oka’ Yanahli Preserve (OYP), located in Johnston County, southcentral Oklahoma. Camera traps were used to collect photographs of mesocarnivores in the preserve during winter (November 2016 – February 2017) and summer (May – August 2017). Six remotely-triggered infra-red cameras were deployed for 4 weeks. After 4 weeks, cameras were moved to different, random locations. Half of the cameras were systematically baited using canned mackerel. A total of 1531 mesocarnivore pictures from winter and 1455 from summer were taken from 25 camera locations in winter and 18 camera locations in summer. Mesocarnivore species identified from both seasons were coyote, raccoon, bobcat, Virginia opossum, and striped skunk. Temporal activity densities were higher for all species during winter than in summer (Circular Kernel Density Estimates) and all species were mostly nocturnal during winter. Temporal activities overlapped largely (>0.7) between all species in winter, except for skunk. Contradictory, the data show that mesocarnivore species present in this preserve do not necessarily avoid each other, rather they co-exist through resource

PaulOlson

University of Central Oklahoma

Standardized Methods for Monitoring the Water Quality of Primary Inflows (Deep Fork River) Entering Arcadia Lake in Central Oklahoma

The global health of freshwater systems affects environmental quality, biodiversity and human access to sources of clean water. In 1948, the US Federal Water Pollution Act was enacted to address water pollution. Nearly 20 years later, the Water Quality Act (1965, amended 1972) required states to issue water quality standards to ensure acceptable sources of freshwater are maintained. In response, the National Sanitation Foundation designed and created the Water Quality Index to monitor freshwater systems. Using nine standard tests, the Water Quality Index (excellent, good, medium, bad, very bad) measures water quality changes over time. The purpose of this research project is to monitor and assess water quality of inflows entering Arcadia Lake in eastern Edmond, Oklahoma. The primary inflow into Arcadia Lake is attributed to the Deep Fork River which begins in storm sewers of northern Oklahoma City, Oklahoma. Several locations at the inflow / lake boundary are sampled and monitored to assess changes in water quality. Standardized water quality methods (dissolved oxygen, fecal / total coliform counts, pH, biological oxygen demand, temperature, total phosphate, nitrates, turbidity and total solids) are utilized to monitor water quality during the research. The overall goal from the inquiry-based research includes evaluating and optimizing test protocols in assessing the environmental health of aquatic systems.

Mathematics and Science.Environmental Science.03

KatherineHamric

East Central University

The Economic Impact of the Use and Production of Biodiesel Fuel

The basis of this research is to compare the impact on the environment of mass producing corn in quantities high enough to sustain the level of volume necessary to produce biodiesel while also not interfering with the cattle industry. Corn is known to be a costly crop and has significant impacts on the soil due to its high usage of fertilizer which also affects the surrounding bodies of water with regards to runoff. In order to produce corn there are also high amounts of water needed to efficiently grow. These alone are reasons why corn is an inefficient material to be used in the oil and gas industry. I hope to highlight and educate the public on the fact that biodiesel is not as environmentally friendly as the name perceives. I will use a compare and contrast chart to show the effects of mass producing corn versus the effects of using biodiesel. I would like to conclude my presentation by informing others that the alternative of electrically engineered and propelled motors is much more efficient on all terms.

Mathematics and Science.Environmental Science.04

MarkPoe

East Central University

The Human Influence on Soil Profiling and Percolation Test

Oklahoma has a population of almost 4 million people with almost half of those living in rural parts of the state. If a home in a rural area is not connected to a domestic waste water systems a small on-site waste water systems plays a major role in the daily lives of the people living in that home. Performing Soil Profiling or Percolation Test is the first step in the design and installation of a small on-site waste water system. These tests can be influenced by humans and when this happens it can be detrimental to a homeowners pocket book and the environment surrounding were the system is installed. How are Soil Profiles and Percolation Test influenced and what effect does this have on a small on-site waste water system?

KayleeCraig

Cameron University

Aquafarming in West Bengal's Sundarbans

After the fall of the Gupta Empire, most of what is now West Bengal was controlled by Sultans who advocated agriculture as the founding ideology of the Empire. Under Khan Jahan, rice paddies began springing up at deltas and estuaries and became one of the first cultivars of the region. During the dry season however, many rice ponds and lakes began to shrivel and fill with rainwater from frequent thunderstorms. Farmers, knowing their rice crops would not make it to harvest, grew wild-caught shrimp larvae to keep a steady flow of income. Looking back into the history of agriculture and aquaculture, shrimp farms did in fact contribute to sustainable farming practices, but it was on a much smaller scale than we see today. The bloom of shrimp farming during the Sultan rule was due to a natural abundance of wild shrimp living in the coastal mangroves and did not contribute any considerable amount to the economy. As India slowly switched to an industrial style of harvesting, these extensive and sustainable practices will be altered solely for economic benefit; and, shrimping will be heavily politicized with the introduction of the East India Company in 1765. In the mid-1980s, the newly independent India accepted a \$425 million loan (in US dollars) from the World Bank to start commercial shrimp farming along the coastline, to which the Indian government also added subsidies. This began a transcontinental drive towards industrial style farming in Southeast Asian countries.

Mathematics and Science.Forensic Science.01

JulietteSmith

University of Central Oklahoma

The Forensic Value of Electrospun Nanofiber Meshes in Sexual Assault Samples

According to the Bureau of Justice Statistics of the U.S. Department of Justice, approximately 323,450 rapes/sexual assaults took place in 2016. The current methodology for separating the DNA of the perpetrator from that of the victim is the same methodology originally described in 1985. It is the current standard for sexual assault cases. That is not to say, however, that it is without weaknesses. It is labor-intensive; some sample is lost during the washes; and carryover occurs between the male and female fractions. The goal of this research is to accomplish the development of an electrospun nanofiber mesh with proper dimensions and adequate strength to separate sperm cells from epithelial cells based on size, not chemical composition, without lysing the cells in the process. Accomplishing a successful mechanism for doing so would result in cleaner differential extraction results, and therefore, cleaner profiles for a DNA analyst to interpret. This would eliminate the subjectivity associated with current analysis and interpretation due to the carryover between the male and female fractions. This would ultimately give electrospun nanofiber meshes relevance within the field of Forensic Science with the goal of assisting in determining the perpetrators in the hundreds of thousands of sexual assaults that occur annually within the United States.

Mathematics and Science.Genetics.01

SamahHoumam

University of Central Oklahoma

Documenting the Expansion of an Invasion of Mediterranean Geckos (*Hemidactylus turcicus*) at the University of Central Oklahoma and its Surrounding Area

The Mediterranean gecko (*Hemidactylus turcicus*) is an exotic, nocturnal species characterized by slow dispersal. It is a good model for studying invasions. These geckos were intentionally, repeatedly introduced to the University of Central Oklahoma (UCO) during 1963-1965 and 1985-1997. Surveys 2005–2010 and 2014–2018 documented the spread of geckos from seven to 30 buildings on campus, and six buildings off-campus in the surrounding community. Seven additional buildings on campus and one building off-campus were inspected but were uninhabited. We collected 213 tail tissue samples with a goal of having 20 samples from each building. We will go back to surveyed buildings where geckos were not observed during the fall. We will also survey new buildings. Based on genotyping of 16 previously published microsatellite loci, we found two subpopulations on and off campus. Using analyses with STRUCTURE and ARLEQUIN, we expect the buildings farther from the introduction site to cluster together, and to have more genetic differentiation compared to the source population. 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.

Mathematics and Science.Genetics.02

DevinWidick, ElizabethHicks, MuatasemUbeidat

Southwestern Oklahoma State University

Genetic Variations in a Caffeine Metabolism Gene in Human

SNIPs 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.

Mathematics and Science.Genetics.03

WilliamStarr

University of Oklahoma College of Medicine

Epigenetic editing of FOXP3 in human T cells induces overexpression and is sufficient to create a regulatory T cell phenotype in vitro

Defects in T cells (Tregs) have been identified in some autoimmune diseases. The development of Tregs is marked by epigenetic modifications, associated with demethylation of the FOXP3 gene. Guide RNA (gRNA) sequences targeting the human FOXP3 promoter, TSDR, and CNS1 region were designed. An epigenetic editing SUNTAG construct was used to facilitate demethylation of specific genomic regions. Constructs containing SUNTAG construct transfected by electroporation into Jurkat cells and cultured for 24 hours. FOXP3 and CTLA4 gene expression was determined by qPCR and FOXP3-TSDR and DNA methylation quantified by bisulfite pyrosequencing three days after transfection. Primary CD4⁺ T cells, stained with CellTrace reagent and combined with FOXP3 epigenetically-edited Jurkat cells were stimulated. Suppression of T cell division was determined by flow cytometry. All gRNAs increased FOXP3 expression. Also, epigenetic editing of FOXP3 resulted in increased expression of the Treg-related gene CTLA4. Epigenetically edited cells resulted in suppression of na⁺ve T-cell proliferation by 20-30%. Epigenetic editing of FOXP3 using a SUNTAG construct induces DNA demethylation, overexpression, and a regulatory T cell phenotype. Our data are intriguing but need confirmation, particularly to clarify the persistence of induced DNA methylation changes and resistance to phenotype switching. If confirmed, this approach has the potential to significantly improve upon current methods of T-reg generati

Mathematics and Science.Kinesiology.01

William Roberts, Matt Vassar

Oklahoma State University Center for Health Sciences

Does Public Interest in Specific Injuries Increase When They Occur During Mixed Martial Arts Bouts? A Study of Google Search Patterns

Mixed martial arts (MMA) is a combat sport that combines fighting techniques from many disciplines, such as wrestling, boxing, karate, Muay Thai, and Brazilian Jiu Jitsu. In the early 1990s MMA entered the United States as the UFC. Both the internet and social media have advanced the popularity of MMA and have increased the public's exposure to fighting injuries. The objective of this research is to examine injuries from popular Ultimate Fighting Championship (UFC) bouts in order to determine whether the volume of Google searches for specific injuries increases after the associated fights. Our sample of injuries was gathered from "Sherdog's Top 10 Worst UFC Injuries" available from www.sherdog.com. Injury information, the injured fighter's name, date of injury, and the popularity of the fighter (measured by number of Twitter followers) were gathered from Google Trends searches. Searches for the fighter and for the injury (i.e., an alignment) had a co-occurring pattern in 9 of 10 cases. The percent change in search interest for injuries increased in 9 of 10 cases (Mdn = 446%, IQR: 168.75%-1643.75%). Search interest in fighters and injuries appears to increase shortly after injury occurrence, possibly providing a window of opportunity for the timely dissemination of evidence-based information about particular injuries by sports medicine personnel. This study highlights how investigation of public search interest may ultimately have a positive impac

Mathematics and Science.Mathematics.01

Erica Bajo Calderon

University of Central Oklahoma

Enhancing a Math for General Education Online Course

The University of Central Oklahoma Math for General Education online course is geared towards students who are not required to take a math course above the College Algebra level. Our goal was to tailor questions in this course to those that the students will see in their future careers. Some of these students will be taking the OGET or other licensing exams that require basic math skills, so we created some questions similar to the ones on those exams. We will show our approach for discovering the academic majors of the students who will be taking this course, the math skills needed for these students's potential careers and the method in which we created questions designed specifically for this course.

Mathematics and Science.Mathematics.04

GraceKelting

University of Central Oklahoma

Using R to Create and Solve Assessment Problems for an Online Math for General Education Course

Perhaps one of the most difficult tasks for teachers is creating appropriate assessment problems to ask their students. Additionally, it may be more difficult to create a large library of questions in order to avoid cheating and provide students multiple attempts on a particular type of problem to deepen their understanding. I have used the mathematical program R to alleviate some of the struggles a teacher may face creating these problems. Specifically, I have written programs that create and solve problems involving apportionment and graph theory for the University of Central Oklahoma's Math for General Education online course. Within the programs is a problem creator that builds a question using randomized numbers and solves it using a specified algorithm.

Mathematics and Science.Mathematics.05

Elizabeth Lane-Harvard

University of Central Oklahoma

Algebra Concepts for Calculus Success

With approximately 300,000 students enrolling in mainstream Calculus I at postsecondary institutions each year, a significant number of them do not successfully complete the course. The MAA reported that there is either something wrong with Calculus I admittance requirements or with instruction. This project considers the former. The purpose of this project is to develop an open-source inventory of the concepts necessary for students to succeed in a university Calculus I course. Research is currently being preformed at UCO, with commitments from other universities to pilot it at a later date. The project utilizes an exploratory, mixed methods, instrument design study approach incorporating both quantitative data (inventory responses vs. final grades) and qualitative data (interviews). This poster will present the current findings and student misconceptions as exposed in the interview process.

Mathematics and Science.Mathematics.06

Casey Skalla

University of Central Oklahoma

Exposing High School Students to Mathematical Problem Solving Through Math Circle

The Central Oklahoma Math Circle is a partnership between Del City High School and the University of Central Oklahoma. The purpose of this Math Circle is to expose high school students to mathematics not normally found in the classroom in an informal setting while encouraging problem-solving and exploration. This poster will present the format of a typical meeting, as well as activities that can be done. In particular, a blood spatter activity will be examined.

Mathematics and Science.Mathematics.07

Zachary King, Thomas Milligan

University of Central Oklahoma

Iterated Line Graphs of Graphs With Regular And Bi-Regular Partitions

Graph theory has many important applications to discrete mathematics and mathematical modeling. One tool that has been used to understand the underlying structure of graphs is the line graph. In 1965, van Rooij and Wilf first characterized iterated line graphs by the growth of their vertex count. In 2017, Balch, Milligan, and Lane-Harvard detailed the properties of the iterated line graphs of regular graphs, bi-regular graphs, and stars. This poster will detail new research being done to extend those results to larger classes of graphs, particularly graphs composed of regular and bi-regular subgraphs.

Mathematics and Science.Mathematics.08

Tessa Neeley

East Central University

Verifying Grad's 13th Moment Approximation

We recreate Grad's Thirteenth Moment Approximation by utilizing the Edgeworth Expansion. This expansion is centered at the Gaussian as opposed to the original centered about the Maxwellian distribution. We verify the validity of this expansion by examining the dimensional units, reduction to Grad's original approximation and creating a numerical approximation.

SeanJesse

East Central University

Building on the Blockchain: A Cryptocurrency Mining Rig Data Analysis

The source of the data used in this project comes from a cryptocurrency-mining rig that serves as a node on the Ethereum Network and provides computing power to it in exchange for shares of the network's currency. In this case 8 Sapphire 11265-01-20G Radeon NITRO+ RX 580 graphics processing units (GPUs) have been repurposed with Claymore's Dual Ethereum AMD+NVIDIA GPU Miner v10.3 software to solve equations within the verification process the network uses, with 1 solution per second (Sol/s) being equivalent to 1 hash per second (H/s). Information from two GPUs on the mining rig such as temperature ($^{\circ}\text{C}$), hashrate (H/s), relative fan speed with 0-33%, 34%-67%, and 67%-100% represented as Low, Medium, and High speed respectively, in addition to whether a GPU obtained a share or not when a share was received have been included. How much the hashrate influences the temperature for a GPU, if a higher hashrate makes a GPU more likely to receive a share, whether adjusting the fan speed from Low to Medium or High speeds to lower the temperature improves the hashrate for a GPU, and whether the mean hashrate of GPU 2 and 3 are different have been analyzed.

Mathematics and Science.Mathematics.10

BritneyHopkins

University of Central Oklahoma

Using Student Critique in a Mathematics Classroom

This poster describes activities that use peer review of student work in a semi-flipped mathematics course to enhance student understanding. By recognizing shared learning objectives for formal arguments in sophomore level composition courses, introductory proof-writing, and calculus courses, we designed an inquiry-based collaborative activity that prompted students--both in small groups and as a class--to identify, apply, and critique key elements in constructing valid arguments and supporting those arguments in both disciplinary contexts.

EricaBajo Calderon, ScottWilliams

University of Central Oklahoma

Minimum Euclidean Function over the Eisenstein Integers

There are many ways of computing distance in the real world. For instance, the distance a crow flies between two locations as opposed to the distance you travel in your car. The same idea holds in mathematics, which brings up the question: Is there always one way which produces a smallest or minimal distance in the mathematical world? In 1949 T. Motzkin answered this question and discovered a recursive method for determining values of a function which computes this distance, or more specifically, this minimal Euclidean norm; however, this recursive method becomes computationally intensive. Over the integers, a closed form for this norm has been found. Our work is centered on the closed form over the Eisenstein integers, or $\mathbb{Z}[\omega]$ where $\omega = (-1 + \sqrt{-3})/2$. This poster will show how we have analyzed the structure of residue classes modulo $a + b\omega$, how this has allowed us to reduce the number of necessary computations to find the minimal norm and describe how these results can be applied to determine the closed form over $\mathbb{Z}[\omega]$. In addition, we will show a bit of code created to plot the values of the minimal norm.

Mathematics and Science.Mathematics.12

NicholasJacob

East Central University

Binning: Dividing Your Histogram

Visualizing large amounts of data is more important than ever. With terabytes of data at everyone's fingertips, effective strategies for organizing and synthesizing data need to be reexamined. This poster will examine different strategies for appropriately choosing how many bins a histogram might require. We will explore different techniques with distribution fitting in mind and examine some visualization tricks that can be used to manipulate the data displays. Special emphasis will be given to Excel and the python package matplotlib for how to make a histogram that tells the story of your data.

Mathematics and Science.Mathematics.13

EmilyHendryx

University of Central Oklahoma

Using Applied Mathematics to Identify Electrocardiogram Features

This work presents a framework for identifying features on a beat-by-beat basis in electrocardiogram (ECG) signals. Since each feature corresponds to a different part of the cardiac cycle, tracking changes in these features over time can provide insight regarding a patient's clinical status. Using tools from numerical linear algebra to first identify a representative subset of beats from a larger data set, we can then use clinical expertise and data science methods to identify individual beat features.

Mathematics and Science.Mathematics.14

ElizabethWissler

University of Central Oklahoma

Automating Problem Set Generation for an Online Math for General Education Course

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 examples, homework, and test problems without the need to purchase pre-made problem sets. In this project, we developed a method to automate problem set generation for the voting theory section taught as part of the University of Central Oklahoma's online Mathematics for General Education course.

MehmetAktas

University of Central Oklahoma

Classification of Turkish Makam Music: A Topological Approach

In this project we study Turkish makam music, a system of varied melodies and chords, computationally. Our main goal is to classify the makams using their notes. For this sake, we utilize the topology of complex networks. We first represent songs with weighted networks where nodes and edges correspond to musical notes and their co-occurrences respectively. We then define the diffusion Frechet function over the weighted networks to encode the network topology and finally reach our goal by combining the function values with machine learning algorithms. Our experiments show that such network representation with the diffusion Frechet function is promising in classifying makam music. We believe that our method can be extended to any music, not only makam music.

Mathematics and Science.Mathematics.16

SamundraRegmi

Cameron University

On a Fast Three Step Method for Solving Equation under Weak Conditions

We present a local convergence for a fast three step method in order to solve nonlinear equations under weak conditions.

Mathematics and Science.Mathematics.17

MichaelFulkerson

University of Central Oklahoma

Fermat Numbers and Finite Groups with Perfect Order Subsets

A finite group is said to have perfect order subsets if the number of elements of any given order divides the order of the group. In this poster, we investigate perfect order subset groups and their relationship to Fermat numbers, which are numbers having the form $(2^{2^n})+1$, where n is a positive integer.

Mathematics and Science.Mathematics.18

MichaelFulkerson

University of Central Oklahoma

The Zeta Function, Logarithmic Integrals, and the Prime Counting Function

The Prime Number Theorem (PNT) states that the number of primes less than a given value x is asymptotically equal to $x/\log(x)$. The PNT was first conjectured by Gauss, but it was not proved until over 100 years later (in 1896) by Hadamard and de la Vallée-Poussin. We explore the history of the PNT as well as results related to the prime counting function, the logarithmic integral function, and the zeta function.

BrittanyBannish

University of Central Oklahoma

Got Milk? Modeling a Dairy Allergy: Oral Immunotherapy and the Immune Response

The Centers for Disease Control & Prevention reports that the prevalence of food allergies in children increased by 50 percent between 1997 and 2011, and continues to rise. There is no cure and treatment and diagnostic protocols are limited. Understanding the dynamics of one treatment strategy, Oral Immunotherapy, is crucial to uncovering the potential for a cure. We build a differential equations model to study the interaction of a dairy allergen with helper T-cells and dendritic cells. Specifically, we are interested in how consistent exposure to an allergen can switch the production of Th2 helper T-cells (responsible for anaphylaxis) into production of Th1 helper T-cells (which do not produce an allergic reaction). Taking into account Th2 cells, Th1 cells, naive helper T-cells, IL-4 and IL-2 cytokines, and dendritic cells, we model the immune response to allergen exposure. We present our model and results, identifying conditions under which the Th1 cells outnumber Th2 cells, thereby changing the body's reaction to an allergen. We conclude by discussing the dynamics for various parameters.

WarrenKeil

University of Central Oklahoma

Attributed network clustering: A Topological Data Analysis Approach

This project proposes a new method to analyze attributed network data using the tools from topological data analysis along with other methods from network analysis. Attributed networks refer to network where each vertex in the network contain a list of features. The most common networks of this type of social networks such as facebook. We then break up the network into smaller subnetworks called ego-network centered around each individual vertex. We then apply a diffusion mapping to convert the attribute network into a weighted graph. We are then able to use the diffusion values to compute homology groups associated with each vertex. These homology groups contain the information about the shape of the data. We then use the Wasserstein distances to cluster the nodes using a hierarchical clustering algorithm.

This project is very interesting from a network analysts viewpoint as it provides a completely new method of clustering attributed network data. Being able to accurate detect clusters in datasets such as facebook is very valuable. This project is also significant from a topological data analyst's view since it provides a method of applying the other tools of topological data analysis to attributed network data.

Mathematics and Science.Mathematics.21

MichaelFulkerson

University of Central Oklahoma

An Investigation of M-Harmonic Functions

A real-valued function on the unit ball in n -dimensional complex space is said to be M -harmonic if it is annihilated by an operator called the invariant Laplacian. We investigate properties of M -harmonic functions and their relationship to holomorphic functions and automorphisms on the unit ball.

Mathematics and Science.Pharmacy.01

CarolineO'Hare

Southwestern Oklahoma State University

Evaluating the Need for Creation of Quality Metrics Regarding Concomitant use of Antifungals and Opioids

To enhance Medicare & Medicaid's efforts to combat the opioid epidemic, information was collected to standardize quality of care regarding the prescribing of opioids and antifungal agents. The objective of this study is to evaluate the effect of antifungal agents as pharmacokinetic enhancers to determine if there is a need for the creation of quality metrics concerning their concomitant use with opioids. Utilizing an academic search engine, articles detailing the use of opioids and antifungal agents were collected. Data from each article was categorized into topic/study design, participant characteristics, outcomes, results, and important notes, and used to evaluate the relationship between antifungals and opioids. There is sufficient evidence of clinically significant interactions between the two drug classes, depending upon the metabolic pathway affected. A quality metric of a maximum milligram per day dosage parameter for opioids when used with triazole antifungals is recommended. A quality metric of avoidance of terbinafine with the use of opioids that rely upon the CYP2D6 pathway is recommended due to decreased efficacy of the analgesic effects of opioids coupled with an increased risk of adverse drug reactions of both agents. The creation of quality metrics would aid in identification of associated risks and varying effects of antifungal agents when concomitant use with opioids is deemed necessary.

Mathematics and Science.Pharmacy.02

SierraMullen

Southwestern Oklahoma State University

Evaluating and Developing Quality Metrics Regarding the Concomitant Use of Opioids and Gabapentinoids

Background:

The opioid epidemic was declared in 2017, and the Centers for Medicare & Medicaid Services (CMS) aimed to gather information to compose an evidence-based guideline that protects patients and decreases opioid abuse.

Objective(s):

The purpose of this project was to evaluate gabapentinoids combined with opioids to determine if there is sufficient evidence of opioid potentiation to support the development of opioid quality metrics regarding their concomitant use.

Methods:

This was a retrospective literature review project of 5 articles related to gabapentinoids potentiating the effects of opioids. A search of articles involving the use of opioids and gabapentinoids was conducted utilizing an online academic search engine. The following limiters were applied to all searches: peer reviewed, full text, libraries worldwide, and published between 2008-2018.

Results:

Based upon the analysis of the 5 gabapentinoid articles, a quality metric limiting milligrams per day of gabapentin is recommended. The maximum dosage of gabapentin should not exceed 900 milligrams per day due to the evidence of increased death and respiratory depression that occurs at increased dosages. There needs to further research conducted regarding Lyrica and opioids.

Conclusions:

The implementation of a standardized quality metric related to gabapentinoids and opioids would assist in identification of potentially hazardous prescribing patterns and monitoring of patient care.

Mathematics and Science.Pharmacy.03

ChloeWilliams

Southwestern Oklahoma State University

Developing Quality Metrics Regarding the Concomitant Use of Opioids and Benzodiazepines and Benzodiazepine-Like Hypnotics

Background: In response to the opioid epidemic and its effects, the Centers for Medicare & Medicaid Services (CMS) have aimed to gather information to compose an evidence-based guideline that protects the wellbeing of Medicare and Medicaid beneficiaries.

Objectives: The purpose of this project was to evaluate benzodiazepines and benzodiazepine-like hypnotics when used in combination with opioids to determine if there is sufficient evidence of opioid potentiation to support the development of quality metrics regarding their concomitant use.

Methods: This was a retrospective literature review project of eight articles related to benzodiazepines and three articles related to benzodiazepine-like hypnotics potentiating the effects of opioids. The following limiters were applied to all searches: peer reviewed, full text, libraries worldwide, and published between 2008-2018.

Results: Based upon the eight articles related to benzodiazepines, a quality metric of no concomitant use is recommended. Based upon the three articles related to benzodiazepine-like hypnotics, a quality metric of avoiding the combination or implementing a time-dependent limiter between the last opioid dose and the hypnotic dose is recommended.

Conclusions: A standardized quality metric regarding the concomitant use of benzodiazepines and benzodiazepine-like hypnotics could be utilized to monitor and unify the current standards of care and allow a more streamlined approach to the use of opioids in practice.

Mathematics and Science.Pharmacy.04

JordynRichey

Southwestern Oklahoma State University

Medication Therapy Management: Empowering the Patient

Objective: The purpose of this research is to educate and highlight the important beneficial outcomes patients, pharmacists, and other healthcare providers receive from Medication Therapy Management (MTM).

Thesis: In providing the community with a better understanding of Medication Therapy Management implementation, importance, and benefit, there will be further increase in an already noticed increase of quality of patient care and outcomes improvement and further decrease an already noticed reduction in health care expenditures and medication-related adverse events.

Methods: To illustrate the benefit of patient empowerment via Medication Therapy Management to the community, we will gather information by utilizing online resources such as cms.gov, amcp.org, pqaalliance.org, etc.; evaluating journal articles; and conducting interviews with pharmacists who have first-hand experience. After analyzing such data, we will compile the benefits, challenges, and downfalls associated with MTMs.

Summary: We expect to use this research to further aid in patient understanding of MTM benefits and importance in overall patient health. ¶

Mathematics and Science.Pharmacy.05

JordynRichey, RileighRicken, VictoriaThompson

Southwestern Oklahoma State University

Medication Therapy Management: Empowering the Patient

Objective: The purpose of this research is to educate and highlight the important beneficial outcomes patients, pharmacists, and other healthcare providers receive from Medication Therapy Management (MTM).

Thesis: In providing the community with a better understanding of Medication Therapy Management implementation, importance, and benefit, there will be further increase in an already noticed increase of quality of patient care and outcomes improvement and further decrease an already noticed reduction in health care expenditures and medication-related adverse events.

Methods: To illustrate the benefit of patient empowerment via Medication Therapy Management to the community, we will gather information by utilizing online resources such as [cms.gov](https://www.cms.gov), [amcp.org](https://www.amcp.org), [pqaalliance.org](https://www.pqaalliance.org), etc.; evaluating journal articles; and conducting interviews with pharmacists who have first-hand experience. After analyzing such data, we will compile the benefits, challenges, and downfalls associated with MTMs.

Summary: We expect to use this research to further aid in patient understanding of MTM benefits and importance in overall patient health.

Mathematics and Science.Pharmacy.06

ShannaSimmons

Southwestern Oklahoma State University

The Happy, Healthy Equine Athlete: Medication Therapies for Joint Health

Equine healthcare is a growing industry, generating over \$601 Million globally in 2017 and expected to keep expanding. While human healthcare has insurance programs to help offset medical costs, equine medical expenses and products are all out of pocket, which drives consumers to look for a proven effective product for their needs. Events promising extraordinary prizes are being hosted, including the recent running of the Pegasus World Cup on January 26, 2019 paying \$16 million in purse money. Owners seek every advantage to keep their equine athletes performing at the highest level, using veterinary services, prescription joint medications, nutraceuticals, in conjunction with compression, ice, and hydro therapy. Joint pain can cause poor performance most notably, however, it can also contribute to poor body composition, attitude, and undue stress. While intra-articular injections provide relief, they are not allowable near race day, as officials in many events test each horse for "performance enhancing" chemicals and such compounds are forbidden. Additionally, while intended to reduce inflammation in the joint and provide analgesia, overuse of steroid joint injections may cause harm in the long term. This review intends to analyze the safe and effective treatments for prevention of joint disease, along with pain relief for arthritic changes to maximize the longevity and comfort of our equine athletes.

Mathematics and Science.Pharmacy.07

TaylorNelms, ElizabethFranklin

Southwestern Oklahoma State University

Pumping Patient Compliance Through Osmosis: Seriously, Employing Pump to Deliver Medications Orally?

Patient medication compliance is an issue often seen when repetitive dosing is required. Sustained release drug products have been proven effective in improving patient compliance by providing a simplified dosage regimen. A novel sustained release drug delivery system called "Osmotic pump drug delivery system"; was developed to alleviate problems associated with patient compliance. Osmotic pumps allow for less frequent dosing, but retain consistent delivery of a therapeutic dose over the specified time interval. However, very limited to none, visual demonstration of the drug release kinetics is reported in literature, which makes it difficult for students, health care professionals and the general population to understand and appreciate this novel technology. The aim of our study was to produce a visual representation of drug release from the osmotic drug delivery system to aid in the understanding of this innovative technology employed for drug delivery. Two different types of osmotic pumps, Push-Pull Osmotic Pump (PPOP) and Elementary Osmotic pump (EOP) were investigated. Visual release mechanism of Sudafed 24 (EOP) and Glucotrol XL (PPOP) were captured by exposing the aforementioned delivery systems in various mediums (aqueous medium, a medium representing gastric pH, and a medium representing intestinal pH). Photographs were taken at specific time intervals to demonstrate the release of drugs from the osmotic pump delivery systems.

Mathematics and Science.Pharmacy.08

FlavourNubonyin, LisaAppeddu

Southwestern Oklahoma State University

Using the Senses to Raise Awareness of Food Choices

Objective: To pilot sensory activities in the concept of a cooking show to educate students about foods and flavors.

Thesis: Building a plate of food using components which impact taste can raise awareness about food choices and, in turn, increase the potential for healthy lifestyles.

Methodology: Two groups of subjects (Girl Scouts, n = 20) and SWOSU College of Pharmacy students, n = 35) participated in this study. Each group started with plain cooked chicken. Subjects then chose five foods representing sweet, salty, bitter, sour, and umami tastes to complement the chicken. To finish, they added spices, discussed cooking effects, plated the food, and gave verbal descriptions, which employed the senses of smell, temperature, vision, and hearing, respectfully. Subjects learned food facts and healthy tips with each sense. To evaluate knowledge on the senses and their potential effects on healthy food choices, subjects were given a 12-item questionnaire prior to and after these activities. Subjects were also asked which activities they enjoyed and from which they learned the most.

Summary: An overall increase in knowledge occurred, from 40 to 54% in Girl Scouts and 64.5% to 80% in Pharmacy students. There were differences in which activities were most enjoyable versus most educational. Preliminary evaluation of results suggests using the five tastes and other sensory activities can raise awareness about foods, to enable healthy dietary choices.

Mathematics and Science.Pharmacy.09

BryanBozell

Southwestern Oklahoma State University

Implementation and Evaluation of a Pharmacist Driven Medication Reconciliation Service in an Academic Medical Center

Transitions of care have been identified in the medical literature as an area in which errors are more likely to occur. Obtaining an accurate medication history is an important step when patients are admitted to a hospital and doing so can decrease preventable medication error rates. Previous studies have shown that pharmacists excel at performing medication reconciliation. With limited resources it will be more cost effective to target high risk patient populations for more intensive medication histories by pharmacy personnel. The objective of this study was to identify the quantity and type of errors corrected on a previous home medication history performed by non-pharmacy healthcare professionals as well as to recognize patients more likely to benefit from medication reconciliation. Patients admitted to the internal medicine service at OSU Medical Center were screened according to predetermined inclusion and exclusion criteria and a medication history was taken by a pharmacist. Demographic data and error rates were documented and categorized. A total of 55 patient's home medication lists were reconciled by a pharmacist, 53 of which had already been reconciled by non-pharmacy staff. Among the 55 patients, 500 errors were identified in the group averaging 9.1 errors per patient. Error rates were highest in patients taking 11+ medications and patients from nursing homes. Pharmacist involvement in medication reconciliation can decrease preventable medication err

Mathematics and Science.Pharmacy.10

ScottLong, LisaAppeddu

Southwestern Oklahoma State University

Non-Nutritive Sweetener Aftertaste: A Review of its Causes, Prevalence, and Perception

Objective: The current project is designed to determine whether perception of non-nutritive sweetener (NNS) aftertaste correlates to actual aftertaste, to determine if perception correlates to genes that determine taste, and choice of consumption. **Hypothesis:** The null hypothesis is that perception of aftertaste and actual aftertaste following NNS exposure does not differ. **Methodology:** A literature review was performed on PubMed using the terms "non-nutritive sweetener", "taste perception", "perception vs. reality", and "aftertaste". All relevant hits were included. **Summary:** The literature review revealed that NNS aftertaste can occur. Aftertaste may be perceived as bitterness or metallic taste that persists after initial exposure. Additionally, aftertaste was variable in its prevalence and intensity, ranging from none to extreme. This perception of aftertaste has been correlated with variability among subjects in genes that code for taste receptors. The review also revealed that in general, perceptions can influence behaviour and actions. However, it did not reveal studies that examined the relationship between the two. Therefore this literature review supports the objective of the project, to determine a correlation and underlying contributing factors between perception of aftertaste and actual aftertaste with NNS and whether that perception can alter choice of consumption of NNS-containing foods.

The "Polypill" for "Polypharmacy"

Patient medication adherence is a serious barrier to improving patient outcomes. A contributor to poor medication adherence is the concept of polypharmacy; the number of medications being taken is associated with regimen complexity. Adherence is also complicated by multiple disease states, cognitive decline, and perception of taking too much medicine. 3D printed drugs may hold the answer to this problem. 3D printing is the latest advancement in technology which makes it cheaper and faster to create new products which gives it the possibility of creating individualized dosage forms. One example of the ability to create a complex dosage form is the only FDA-approved, commercially available 3D printed tablet, Spritam[®], which is an orodispersible tablet (ODT) that disintegrates in a matter of seconds, reaches T_{max} within minutes, and contains significantly more drug than competing ODT drugs. Another example of using 3D printing to create complex dosage forms is the polypill. It was shown in laboratory settings that 3D printing can be used to combine multiple drugs with different release mechanisms. Another possible advantage is to allow dispensing pharmacies to print individualized dosage forms with their own 3D printer for the patient to pick up. 3D printing offers an economic and patient-friendly solution to poor adherence due to complex medication regimens.

Mathematics and Science.Physics.01

SanjivJha

East Central University

Vibrational Signatures of Carboxylated Graphene: A Computational Study

Raman and infrared (IR) spectroscopies are fast, efficient, and nondestructive techniques commonly used for structural characterization of carbon nanomaterials. Using computational methods based on density functional theory, we computed the vibrational Raman and IR absorption spectra of carboxylated graphene containing no surface defects, containing Stone-Wales defects, and containing divacancies. Our calculations demonstrated that the presence of point defects near the functionalization sites significantly altered the Raman and IR spectra of carboxylated graphene. In all cases, we observed the emergence of new Raman and IR absorption bands in the range of low and high frequencies. The calculated Raman and IR spectra showed clearly distinguishable spectroscopic signatures associated to different types of structural defects present in carboxylated graphene. The results of our study provide guidelines for the interpretation of Raman and IR spectra of chemically functionalized graphene.

TrevorBerg

East Central University

Analysis of Newton's Rings Interference

A plano-convex combination lens produces an interference pattern of concentric circles known as Newton's rings. The objective was to measure unknown properties of the plano-convex lens by using characteristic relationships of Newton's Rings and thin lenses. Concentric fringes produced by the lens were visually counted, and the radius of the ensemble was measured. This data allowed the radius of curvature to be calculated. To verify this work, a different approach was taken. If the focal length was found using the thin lens equation, the radius of curvature could be calculated. However, the plano-convex lens was not easily focused. It was hypothesized this was due to an extreme focal length, and a two lens system could solve the problem instead. The system contained a lens with known properties and the plano-convex combination lens. It could be used to measure the unknown focal length of the plano-convex lens, and by extension find its radius of curvature. This method was also difficult due to the long focal length. Tiny changes in measured lengths resulted in huge percent differences and occasionally errors. Therefore, it was difficult make accurate comparisons for verification. Nevertheless, the research was valuable, and it was found in a publication that Ophthalmologists apply the same method of counting concentric Newton's rings to visually check for astigmatism and calibrate prescription lenses.

Mathematics and Science.Physics.03

LoganMurphy

East Central University

Gamma Spectral Analyses of Granite Samples

Samples of many different kinds of granite were obtained from a local vendor who has naturally occurring samples from all over the world. The samples were massed and the radioactive dose rates were measured for comparison. The gamma energy spectrum of each sample was obtained using a NaI Detector connected to a UCS-30 that was interfaced to a computer. Tables and literature were used to match the energies obtained to the major radioactive isotopes present in each sample. Health implications for large amounts of granite in public areas will be discussed.

Mathematics and Science.Physics.04

JonRisner, SusmitaHazra

Cameron University

Solar Activity Variation and Its Effect on Ionospheric Electron Density

As the Sun progresses through its solar cycle and its activity increases, more number of sunspots occur and solar fluxes become more intense. The change in solar activity is related to the change in electron density of the ionosphere. Studying this relation is very important in terms of space plasma studies and space weather predictions, which play a significant role in radio and satellite communication as well as GPS navigation. In this poster we are presenting the sunspot and solar flux data for solar cycle 24 (year 2008-2018). During solar minima, sunspot number varies from 0 to 20 and solar flux varies from 60 SFU (Solar Flux Unit) to 68 SFU. During solar maxima, sunspot number varies from 60 to 140 and solar flux varies from 90 SFU to 150 SFU. We are using CHAMP satellite data to understand the variation of electron densities of the upper atmosphere with solar cycle 24. We will be comparing this results with IRI (International Reference Ionosphere) model. This data set can be used as a framework for future advancement in empirical modelling of regional and global electron density of the ionosphere.

Mathematics and Science.Physics.05

She'KaylaLove, SusmitaHazra

Cameron University

Seasonal Variation of F2 Peak of Ionosphere

The environment in the top layer of the Earth's atmosphere which we call as ionosphere changes from hour to hour and from day to day due to its interaction with Sun. As a part of this research, we are studying the F2 peak of the ionosphere using ionosonde data. We are using the data for King Salmon (latitude 58.4 degree, longitude 203.6 degree) station. During winter time of solar minima (year 2008) F2 peak varies around ~1.6 MHz to ~2 MHz and during summer time it varies between ~3.1 MHz to ~4 MHz The height of the F2 peak varies between ~180 km to ~370 km. The results of this research project will be important in terms of space plasma studies and space weather predictions, which play a significant role in radio and satellite communication as well as GPS navigation.

Mathematics and Science.Physics.06

AlbanyBlackburn, ShayneJohnston

Oklahoma School of Science and Mathematics

Self-Excitation, Parametric Forcing, and Chaos in the Dynamics of Dust-Grain Charge in Dusty Plasmas

The Van der Pol equation describing self-excited oscillations, and the Mathieu equation exhibiting parametric excitation, are each well-studied and have numerous applications in physics, engineering, and biology. A combined Van der Pol-Mathieu equation has been shown to arise from a simple model for the dynamical behavior of charged dust grains in dusty plasmas (Momeni et al., 2005). A systematic numerical study of this combined equation reveals a rich variety of nonlinear behavior including widespread chaos. An improved derivation of the equation leading to quasiperiodic parametric forcing, as well as the inclusion of external forcing and Duffing nonlinearity have also been studied.

Mathematics and Science.Physics.07

ChristopherFickess, AlyxPerkins

University of Central Oklahoma

Cosmic Radiation Detection Utilizing Muon Particle Detectors to Distinguish Rates of Muon Interactions Compared with Elevation

The purpose of researching muon particle interactions is to confirm whether elevation effects the rate of particle interactions occurring based on the elevation in which the detectors are positioned. Muons exist for 2.2 microseconds and pass through everything except for extremely dense materials or elements. Utilizing Galilean Relativity, the probability of muons existing at sea level is impossible, but it is known that they can travel to this elevation. Employing the Theory of Special Relativity, the probability of these particles existing at sea level is realistic. Throughout the project, muon particle detectors will be taken to multiple locations to document various readings of muon particle interactions compared with elevation. These elevations will range from mountain altitudes to sea level and attempt to determine an accurate trend line for the cosmic radiation occurring based on the muon particles being detected. By stacking the detectors, the number of vertical trajectory muons will be found, and the horizontal trajectory muons will be neglected. Using the data collected during the last few months, the goal is to determine if the amount of muons detected is affected by the elevation.

Mathematics and Science.Physics.08

WayneTrail

Southwestern Oklahoma State University

Building and Using Lehman Seismometers

Seismometers are used to detect vibrations in the earth. They can be made extremely sensitive even with very simple and inexpensive parts. The most basic seismometers behave like horizontal pendulums, which are caused to swing when the earth undergoes small movements. The swinging motion is made to produce a tiny current, which we detect and record using a micro-controller. A few seismometers separated geographically allow one to triangulate to the location of the earthquake. We have built a few Lehman seismometers which we are currently testing and calibrating. We can now detect earthquakes as low as 2.5 on the Richter scale anywhere in Oklahoma.

Mathematics and Science.Physics.09

WayneTrail

Southwestern Oklahoma State University

The Dobsonian Telescope: An Outreach Exploration II

We are reclaiming optical equipment from some of our older, unusable telescopes, to incorporate into new portable Dobsonian telescopes, which we are building and hope to use for viewing sessions in more distant communities, and on trips. SWOSU has several old non-working telescopes that either broke (irretrievably), or were donated and unusable, but which have good to excellent optics and can be rescued from obsolescence with careful construction. We have begun with some of the smaller optical systems (6 inch diameter mirrors), but we will be making telescopes out of 10 inch, 12 inch, and 16 inch mirrors in the future. Considerable care has to be taken to make sure the telescopes move extremely smoothly and can be pointed very precisely; this is the challenge in building a usable (great) Dobsonian telescope. In addition to using them for on-campus observing sessions, we hope to use these telescopes as part of Physics Club community outreach by taking them to other towns.

Mathematics and Science.Physics.10

WayneTrail

Southwestern Oklahoma State University

Automating the SWOSU Observatory

Recent, low-cost, high-quality astronomical cameras have made it possible for us to use SWOSU's 16 inch Ritchey-Cretien telescope to take very high quality images of faint astronomical objects like distant galaxies and nebulae. One challenge we have faced in this astrophotography is that these images often require long exposure times, as much as several hours. During this time the Earth is rotating so the telescope has to track its target across the sky over the course of the night. The SWOSU Observatory, which houses our telescope, consists of a 15-foot diameter dome with a closable slot the telescope looks through. So as the telescope tracks a target across the sky, the slot must be regularly adjusted (usually every several minutes) to keep the telescope looking through the slot. This part of the process is very tedious, particularly in the wee hours of the morning. In this work we use microcontrollers to allow the software that controls the direction the telescope is aimed to also correctly position the dome so that the astronomer doesn't have to.

Mathematics and Science.Physics.11

DouglasBryhan

East Central University

A Comparison of Artificial and Natural Lighting Spectra and Intensities

Recently concerns have been raised about the spectra from various new artificial lighting and display technologies representing potential long term harm to human eyesight. Spectra from various lighting and electronic displays will be experimentally compiled and compared to spectra of ordinary sunlight as a reference to assist in the assessment of potential hazards.

Mathematics and Science.Psychology.01

KelseyGaskins

University of Central Oklahoma

Validation of Pupillometry as an Objective Measurement with the use of Virtual Reality

Pupillometry is the study of the psychophysical state an individual may be in before and after a stimulus has been presented (Laeng, 2012). With the rise in new types of technology, virtual reality is being used to determine whether pupil dilation is an accurate measurement for autonomic activation. This coupled with the determination whether virtual reality plays a part in valence, will further support an existing theory that virtual reality increases the ecological validity in experimental settings. Participants will view multiple 360 – degree videos from multiple levels of intensity and valence in random order while their pupil dilation and constriction are being measured in real time. The researchers hypothesize that the higher the level of subjective intensity and unpleasant valence, the larger the pupil dilation will be. A headset that was created for game development is being used for the interesting software. In doing this, the researcher will be given the unique opportunity to measure pupil dilation while the participant takes part in a semi – realistic setting. This opens up new doors in the area of measurement for the field of Psychology. There is a possibility that a baseline reading can be created using pupillometry. By using the dataset from Gaskins and Rupp: Validation of Pupillometry as an Objective Measurement with the use of Virtual Reality (2018), a generalized baseline reading for autonomic activation may also be created.

Mathematics and Science.Psychology.02

SarahMarkland

Oklahoma State University

Honey Bee Shift Work in Comparison to Learning Behavior and Foraging Profiles

Apis mellifera, also known as the European honeybee, sometimes shows a bias toward specific colors of flowers. They can also have preferences for foraging at specific times of the day, i.e. morning or afternoon shifts. The question this research aimed to explore was whether or not a bee who was particular in choosing a shift, was also particular regarding decision making while foraging. Our hypotheses were that shift work would correlate with foraging behavioral patterns and that bees would react to a decrease in flower reward by choosing the more reliable color of flower. We set up two beehives and taught them to visit feeders of sucrose water. The bees were then marked with different colors specific to hive and time of day to observe the shift work behavior. Then, the marked bees were followed in order to observe their decision-making process when the reward of a particular color of flower, that had previously been experienced as consistent, was reduced while the other remained higher. We found that the bees fit into one of four categories of foraging behavior, which did not correlate with their shift work preference. We also noticed that the frequencies of morning bees and afternoon bees were not evenly distributed.

Mathematics and Science.Psychology.03

SephraScheuber

University of Central Oklahoma

Physiological and Emotional Reactions to Timbre in Voices and Instruments

Humans detect and react to characteristics of timbre in speech and instrumental sounds, but the relationship between emotions conveyed by non-verbal vocalizations and those conveyed by electric guitar sounds is unknown. It is predicted that listeners will have the same physiological and emotional responses to guitar sounds as they do to corresponding non-linguistic emotional speech sounds. It is also predicted that sounds with more complex timbre will result in higher complexity in EEG signals. These hypotheses will be explored by collection and analysis of EEG data of participants as they listen and respond to guitar and vocal sounds. These sounds will be analyzed and compared on certain characteristics of timbre. EEG data will be smoothed with Empirical Mode Decomposition (EMD) and analyzed for N400 ERPs. Alpha and beta waves will be extracted through a Wavelet Transform (WT), and then a Multifractal Detrended Fluctuation Analysis (MFDFA) will be completed for complexity analysis. An understanding of psychophysiological reactions of listeners between electric guitar sounds with timbral variations and non-verbal affective vocalizations has the potential to inform creative choices in entertainment communities about non-linguistic elements of human communication and has potential applications for health and wellness.

Mathematics and Science.Psychology.04

MadisonDay

University of Central Oklahoma

Determination of the Sexual Appeal of Age in Relationship to Dark Triad Personality Traits

The purpose of this study was to determine if a certain age group is seen as more sexually attractive to individuals with Dark Triad personality traits. Previous research has investigated women's attraction to psychopaths; however, there is a significant gap in the literature on what someone with the traits of Narcissism, Psychopathy, and Machiavellianism finds attractive. It is hypothesized that individuals with high scores on the Short Dark Triad 3 questionnaire will be more attracted to middle-aged (40-50) individuals. As supported by the Evolutionary Psychology theory of resource recognition and acquisition, middle-aged individuals may seem more appealing to high-scoring Dark Triad individuals as middle-aged individuals would have more resources acquired as well as a possible desire for companionship. This cost-benefit analysis on the part of the Dark Triad individual would make the middle-aged individuals more appealing than younger (20-30) or older (60-70) individuals. Participants will view a series of portrait-style photographs while the EyeTribe, an eye tracking device, measures their pupillary response. As the study is ongoing with very few participants at present, data has not yet been analyzed. Once we establish particular traits of attractiveness that appeal to high Dark Triad personalities, such demographics can be taught to recognize warning signs in a relationship with the potential to be unhealthy.

Mathematics and Science.Psychology.05

ElizabethDwyer

Northwestern State University

How Does Sleep Affect College Students' GPA?

Recent research has shown that the lack of sleep in college students has become a problem. College students have been recognized as one of the top populations that suffer from sleep-related problems (Buboltz, Brown, & Soper, 2001). Because of increasing difficulties with sleep, various areas of college students' lives are affected. In particular, research has shown that academics suffer from an insufficient amount of sleep. However, many college students may not even be aware of the fact that sleep or lack thereof, can affect their performance in the classroom (Gilbert & Weaver, 2010). The purpose of this study is to see the effect of sleep or lack thereof, on college students' grade point averages at a small Midwestern university. Other variables that likely factor into how well a student may sleep include stress at school, at work, student-athlete stressors, and stress in relationships. Other areas that may inhibit students from attaining the level of sleep necessary to succeed in the classroom may be due to, technology and daytime napping.

Can Mock Jurors be Primed Towards Guilt or Innocence by Initial Statements Prior to Evidence Evaluation?

This study will investigate how mock jurors select evidence when given a choice and whether their evaluation of evidence is influenced by an initial narrative. Participants will be randomly assigned to read one of three narratives designed to suggest guilt, innocence, or neutral stance towards a suspect. Participants will choose from six types of evidence (three eyewitnesses, three physical items), beginning with the most important and ending with the least important. Once an item of evidence is selected, participants will have four additional sub-evidence items to review (two suggesting guilt, two suggesting innocence). Participants will select sub-evidence from most to least important and rate each for guilt. Once each sub-evidence is rated, participants will return to the original six items and repeat the process for the remaining evidence until all six have been selected and all sub-evidence have been rated. Participants will make a confidence rating followed by a final guilty/not guilty verdict. It is predicted that participants primed with the guilt narrative will find the suspect guilty more than those primed with the innocent or neutral narrative; participants primed with the innocent narrative will find the suspect innocent more than those primed with the guilt or neutral narrative; and participants primed with the neutral narrative will find the suspect guilty more than those primed with the innocent narrative but less than those primed with the guilt narrative.

Mathematics and Science.Psychology.07

AshtonHood

Other

Mathematics and Science.Psychology.08

HuyenTran

University of Central Oklahoma

Assessing the Relationship Between Altruistic Behavior and Stress

Altruism is the motivation to intentionally help others at a cost to one's self. Some studies found a negative correlation between altruistic behavior and the stress response (stress is reduced when an individual performs altruistic acts), while others found out that high levels of stress can actually increase altruistic behavior. The objective of this experiment is to gain a more conclusive understanding of the relationship between altruistic behavior and stress. The hypothesis of the present study is that individuals who display more altruism will have lower cortisol levels than those who display more selfish behavior. I also predict that women will display more acts of altruism than males. Participants are 30 undergraduate students at the University of Central Oklahoma. The participants will provide a saliva sample to establish baseline cortisol levels. They will next play the Dictator game to measure their altruistic behavior. Saliva samples will also be obtained after the game. The saliva samples will be analyzed using an enzyme-linked immunosorbent assay (ELISA) test. Comparisons of the pre- and post-test samples will reveal changes in cortisol levels. Statistical analyses will reveal the relationship between altruistic behavior exhibited during the Dictator game and cortisol levels.

Mathematics and Science.Psychology.09

RuthEgbom

Southwestern Oklahoma State University

Obsessive Compulsive Spartanism (OCS)

Decluttering Marie Kondo-style where “less is more” can be a good thing. But what if it “hijacks” one’s decluttering efforts? In her poster presentation, Ruth Egbom from Nigeria, will share her compare-contrast study on how Obsessive Compulsive Spartanism (OCS) can become a problem. In her poster presentation, Ruth hopes to address and raise her audience members’ awareness on why some people can’t bear the thought of “any stuff hanging around the house,” or “decluttering their space,” and whether there’s any link between hoarding and compulsive discarding. The presenter will also discuss how ERP therapy may be a good choice for treating OCS.

Mathematics and Science.Psychology.10

AmbreChambers

University of Central Oklahoma

Individual Susceptibility to Violent Mob Activity

With the growing instances of civil unrest, it is important to understand what makes one more susceptible to performing violent acts that they would not normally perform. We will identify characteristics that can predict how participants will respond to emotionally-arousing vignettes in different social contexts, and correlate this to data from a self-report scale and the Big Five personality inventory. A biological measure of arousal will be used to assess physiological changes in the individual. The ability to identify the factors that predict a person's involvement in a mob will be useful in diffusing situations before they become violent.

Mathematics and Science.Psychology.11

RhiannonBahnmaier

Southwestern Oklahoma State University

Representation and Careers of Women in the Videogame Industry

This essay examines the connections between the representation of women in videogames, and whether this impacts women's view of the videogame industry as a viable career possibility. There is a correlation between improved representation of women in videogames and having women work in the videogame industry, but that does not mean they are being employed in higher positions, such as game developers. Historically, women in the videogame industry only represented 30% of the work force, and only 3% of game developers were female. The research presented uses feminist methodology as a lens, and contains a historical overview of the field, as well as different psychology studies. Female representation and its relationship between the videogame industry is a new field with little research done. This concept provides insight to a possible untapped market of women in the videogame industry, and has implications for psychology, gender, and the videogame industry itself.

Mathematics and Science.Psychology.12

Ruben RiosRios

University of Central Oklahoma

Effectiveness of Acceptance of Commitment Therapy on the Relationship Quality of Parents of Children with Autism Spectrum Disorder.

Acceptance and Commitment Therapy (ACT) is a popular treatment developed by Steven C. Hayes to help individuals overcome their obsessive and unwanted thoughts by teaching them to be aware of those and to engage in a replacement behavior. The current study looks at the effects of Acceptance and Commitment Therapy on 2 parents of children diagnosed with Autism (ASD). Two pairs of parents were included in this research. The parents received ACT training over the duration of 3 months. All of the parents showed a decrease in their engagement of negative and unwanted thoughts after implementing ACT techniques. Parents 2 and 3 did not engage in thoughts during the last week of treatment. While parents 1 and 4 were able to reduce the frequency of unwanted thoughts by at least 80% when compared to baseline. Acceptance and Commitment Therapy shows be an effective treatment for parents of children on the Autism Spectrum.

Theodore Mofle

University of Central Oklahoma

Action-Specific: Individual Perception of Task Difficulty

The action-specific hypothesis is that perception depends on interactions between the perceived features of the environment and the perception of one's abilities (Witt, 2011). For example, carrying a heavy load up steep incline can make a hill seem longer and steeper than if the load is lighter and a ledge looks higher when fear of heights is greater (Proffitt, 2006). Age may influence the perception of one's physical abilities such that being older may mean that loads seem heavier and distances further. Sixty participants helped test the action-specific hypothesis in relation to the perception of length and distance. They performed three action tasks. The first was estimating the distance to a target. Participants provided estimates of the distance from the target by moving laterally the same distance they perceived the cone to be. In the second task, they balanced a wooden dowel rod in the center of their palms. Then they estimated the length of the dowel by holding their hands apart the perceived length. In the third task, they verbally estimated the distance to a tennis ball from a chair where they sat holding a standard grabber-type reaching tool or no tool. Analysis of variance revealed age differences in mean estimated distance in the cone task and length in the dowel task. No age difference was observed in the tennis ball task, although there was a difference between the no tool and the reaching/grabbing tool conditions within the older group.

Mathematics and Science.Psychology.14

AngelaKnight, JefferyLiu

University of Central Oklahoma

A Woman's Perspectives on Death Analyzed Through Linguistics

Natural language use reflects an individual's mental state and contains indicators of their emotions. Linguistic analysis allowed us to examine women's language use to gain insight on occasionally subconscious thoughts or feelings regarding death. Death related concerns, for many individuals, are not frequently openly discussed or considered. Language use, when writing about death, reflects individual concerns about death. We performed an exploratory analysis of language usage in women when writing about their thoughts and feelings about death. We analyzed 20 documents written by women in 2019 regarding their thoughts and feelings of death using the Linguistic Inquiry and Word Count. This exploratory analysis allowed us to examine the words women chose to use when writing about death, and gain insight regarding their mental state about death. These findings may be applied to similar future research comparing male and female differences regarding death related concerns.

Mathematics and Science.Psychology.15

University of Central Oklahoma

Mathematics and Science.Psychology.15

BreannaWedde, J. AdamRandell

University of Central Oklahoma

Moral Foundations’ Influence on Blame Attribution of Male Sexual Assault Victims

Graham and his colleagues (2009) found that conservatives and liberals use different sets of moral foundations when assessing everyday situations. Blame attribution has been linked to participant’s beliefs in rape myths which are usually based on stereotypical gender roles, such as a male should be able to fight off an attacker (Davies, Gilston, & Rogers, 2012). Conservatives tend to hold more traditional values; thus, they may be more likely to blame sexual assault victims when the circumstances threaten those traditional gender roles. Participants answered a moral foundations questionnaire, read a vignette of a sexual assault in which the victim was male and varied in victim sexual orientation and perpetrator sex. Participants then answered questions that assessed the amount of blame they attributed to the victim. We found that when participants held high ingroup/loyalty foundations, they attributed more blame when the victim assaulted by a male perpetrator.

AlexandraCassidy, CaitlinParker, MirandaWoodard, JacksonEngland

Southwestern Oklahoma State University

Video game character selection and modification options

Overall males and females play video games in similar numbers (ESA, 2017). There are differences in the games and genres favored by each however (Yee, 2017a) with females being less likely to prefer shooter and sports games. The features of games that appeal to different gamers are relatively unexplored but Yee (2017b) reported that female gamers rated the availability of a female protagonist as a play option was very important in their game experience. We examined the representation of character selection and modification options in video games. The overall question was: What options are available for players in terms of gender and minority characteristics for players? Overall, character selection was less available in first person shooter games and more common among sports games. However for these games the character selection was mainly choosing from among male characters. Character modification options were more common among RPG and fantasy games.

AlexandraCassidy, CaitlinParker, JacksonEngland, MirandaWoodard

Southwestern Oklahoma State University

Gender representation on video game covers

Lynch et al (2016) reported that depictions of females in video games had improved over the last 30 years but that some genres such as first person shooter games primarily present portrayals of females as sexualized and secondary. In the present study we attempted a comprehensive content analysis of video games released in the US in 2017. Video game covers were examined as this is typically the first image seen of a game and the primary focal point in a retail setting. Approximately 350 video games were identified. Each cover was coded for the presence and number of characters (human, non-human), gender of each character, and primary or secondary status of the character. Females were present on significantly fewer covers (approximately 30%) compared to about 50% for males. However, males were not more likely to be portrayed as primary characters (30% vs 26%). Females were not more likely to be secondary characters (15% vs 13%).

Mathematics and Science.Psychology.18

AlexandraCassidy, JacksonEngland, MirandaWoodard

Southwestern Oklahoma State University

Predicting the creation of video game characters for males and females

Males and females play video games in similar numbers (ESA, 2017). There are differences in the games and genres favored by each however (Yee, 2017a) with females being less likely to prefer shooter and sports games and to prefer fantasy games. The reasons for this disparity are not well understood. One possibility is the greater flexibility in character selection and creation for some genres may be a factor. On average male preferred genres are known for presenting females in a sexualized manner for example (Lynch et al., 2017). We examined the characters female and male players created when given information about the genre of the game they would play (e.g., fantasy, first person shooter) and details about the setting of the game (e.g., winter). Participants used a character creation program that permitted modification of body characteristics, selection and modification of clothing, and selection of accessories (e.g., weapons).

DaelynBernard, LaylaRich

University of Central Oklahoma

The Effectiveness of Biased Questions on Students's Attitudes Toward the ROTC

In a culture of advertising and persuasion, research into the power of words has become more relevant. Our experiment attempts to establish the extent to which biased questions influence the attitudes of students toward the military and the Reserve Officers's Training Corps (ROTC) in particular. As a second objective, if participants who received the biased questionnaire report a higher opinion of the ROTC, would that attitude be enough to motivate them to action? The aim of this study is to determine if participants presented with a questionnaire that has biased phrasing and word choice will report a more favorable attitude toward the campus Reserve Officers's Training Corps (ROTC) than participants presented with the same questionnaire that has neutral word choice. Participants who begin to leave the laboratory after completing the questionnaire will be presented with a display of ROTC pamphlets. A record will be kept of how many students from each group take a pamphlet. Results are preliminary at this time, but the prediction is that participants in the biased questionnaire group will report a higher opinion of the ROTC than those with the neutral questionnaire. However, the experimental group is not expected to be motivated to take more pamphlets than the control group.

Mathematics and Science.Psychology.20

Zachary Walling

University of Central Oklahoma

Adverse childhood experience as a predictive factor of atypical sexual behavior.

AshtonHood, KallieSmith

Other

Behavioral and Cognitive Effects of the College Experience on Students's Wellbeing

Post-secondary students face a unique set of living conditions that can exacerbate stress levels as well as provide the opportunity for social and academic betterment. We conducted a qualitative study to determine what effects higher education have on students, particularly as it pertains to the concept of intimacy vs. isolation. Participants were taken into a private room and interviewed using a qualitative survey and an oral assessment to determine how the role of being a student has impacted their overall health mentally, physically and spiritually and emotionally. Students were questioned specifically about how they felt regarding their college experience thus far and asked to detail the specific positive and negative aspects of college life and any changes that it had caused for them (i.e. weight gain or loss, increased stress, social development, etc.) To ensure validity, researchers kept the data anonymous and individually analyzed all of the data, creating a system of checks and balances. Through thematic analysis, we found that college life can cause an increase of stress and emotional distress if the student lacks a solid support system and has experienced difficulties adjusting. This is vital information for institutions and can be used to improve or create programs dedicated to helping students transition into college.

Mathematics and Science.Psychology.22

MickieVanhoy

University of Central Oklahoma

Racial Bias In Police-Civilian Interactions

Examples of police use of force against African-Americans is widely distributed across standard media and media. Attitudes about these interactions are decidedly mixed. The current study was designed to examine the perceptions of the local populace in a response time task. If media reports and scholarly literature are generalize locally, then we may expect that people who are not African-American to be more tolerant of the use of force against African-American, viewing it as more justifiable under the circumstances. We may also expect the opposite result from African-American people who view the same interactions.

A computerized task presented via PsyToolKit will present participants with photographs of police interactions with African-Americans and Caucasians in the same scenarios including ordinary activities like getting out of a car or standing in front of a shop. Participants will also see confrontational interactions like traffic stops, pat-downs, and heated verbal exchanges. Participants will indicate how much of a threat to the officer the civilian seems to be and how likely they are to be armed. The results will be analyzed with an analysis of variance on the choice response times.

justindurham

University of Central Oklahoma

Replicating Threat-Avoidance Bias Toward Arab/Muslim Targets

Previous research of the shooter bias effect focused on Black versus White male targets, with unarmed Blacks mistakenly shot more often than Whites (Greenwald, Oakes, & Hoffman, 2003; Payne, 2001). Although the shooter bias is considered a robust phenomenon, most of the research has focused exclusively on Black versus White targets. This raises the question of whether this effect can be found using targets of other threat-related groups. If the shooter bias is indeed driven by threat-related schemas, results should find a similar bias when using other ethnic targets and objects. Limited research indicates both Black and other ethnic minorities, such as Arab-Muslim males (Fleming, Bandy, & Kimble, 2010), are stereotypically associated with violence and avoidance more than Whites and Asians (Sadler et al., 2012). Recent research has replicated the original shooter bias effect using Arab-Muslim targets and knives in a European population (Essien et al., 2017). The present research tests whether the shooter bias is generalizable to Arab-Muslim targets, and whether this bias is evident when using knives compared to firearms. It was hypothesized that participants will perform significantly more accurate and commit more errors when primed with Black and Arab/Muslim targets compared to White targets. Data will be analyzed using repeated measures ANOVA and signal detection measures to test shooter and avoidance bias towards Arab/Muslim, Black, and White targets.

TarynWagner

Randall University

Do We Really Think for Ourselves?: A Naturalistic Research Experiment in Conformity and Heuristic-Based Thinking

This experiment is a variation of Asch's (1970) Line Study. Because human beings are innately social, we have the propensity to alter our way of thinking to match others'. Two alternative theoretical explanations—our tendency to conform in social situations and our brain's tendency to resort to heuristics—may explain this phenomenon. In order to test these theories, I adopted a naturalistic approach. The experimenter posed a simple mathematic equation in multiple naturalistic social settings with a confederate nearby. The experimenter would answer her own question with an incorrect answer, and the confederate would confirm that answer, thereby creating an environment conducive to conformity. If a participant contradicted the experimenter, the experimenter and the confederate would argue in favor of the incorrect answer. The experimenter's hypothesis is as follows: when a participant is provided an incorrect answer to a simple mathematic equation, he or she will accept that answer either due to heuristic-based thinking or because of mankind's tendency to conform in social situations. Participants' responses were categorized as heuristic-based thinking or as conformity largely because of their latency (or lack thereof). While the resulting data indicate that the hypothesis was incorrect for the majority of participants, 36% of participants used heuristics and 43% considered conforming when put under pressure by the confederate and

ToniNigro, ShelbyRauh, Matt Vassar

Oklahoma School of Science and Mathematics

Evaluation of Systematic Review Utilization in the Development of OB-GYN Randomized Controlled Trials

The issue of research waste has been raised due to the fact that 85% of funding for biomedical research has been improperly utilized. A prominent issue is the frequency of randomized controlled trials (RCTs) being conducted without prior consultation of existing support, such as systematic reviews (SRs). Meticulous monitoring is necessary to ensure that clinical recommendations are being made with confidence in high-quality biomedical practices. The aim of this study was to survey OB-GYN journals to analyze their published articles for citation of SR for justification of conducting the RCT. We conducted a search of PubMed for RCTs published between 2014 and 2017 in the top 10 OB-GYN journals. Studies were evaluated to determine the number of SRs cited in the introduction, methods, and discussion. We further analyzed whether the SR was cited verbatim or indirectly, number of participants, type of intervention being studied, funding source, type of trial, and how the outcome was perceived. Of the 720 articles from our initial search, 458 (63.61%) met inclusion criteria. Of the 458 included studies, 279 (60.92%) cited an SR in the introduction, 34 (7.42%) in the methods, and 207 (45.2%) in the discussion as justification for conducting the study. A large portion of the RCTs being published in clinical OB-GYN journals are not citing SRs as justification for conducting their studies, which may be leading to an increase in research waste.

Mathematics and Science.Statistics.02

Khue TuDoan

University of Central Oklahoma

Exploration of Factors Influencing Low Birth Weight Infants in Oklahoma

This project analyzed the relationships between low birth weight infants (weighing less than 2500 grams) and characteristics of the mother and the birth. Oklahoma data for all live births in 2016 (n=52,592) was obtained from the CDC. Literature suggests several risk factors for low birth weight associated with the birth: less prenatal care, plurality (twin/triplet), males, early live birth order, and gestational age. Maternal risk factors include: young age, less education, race other than white, unmarried, smoking, pregnancy-associated or chronic hypertension, eclampsia, and diabetes. In addition, the study focused on comparing national natality statistics to those in the state of Oklahoma. Tables were used to summarize low birth weight for each of the dichotomous risk factors. Data was graphically summarized with regard to birth weight for age vs marital status, age vs race, race vs gender, and race vs education. Statistical tests included chi-square tests for significant differences in proportions and logistic regression modeling for predicting low birth weight.

Mathematics and Science.Statistics.03

AlkinHuggins

University of Central Oklahoma

Metacognitive Studying Strategies and Student Success in General Chemistry

The aim of this project is to determine whether a presentation on metacognitive strategies for studying has led to an improvement in the performance of students taking General Chemistry I. Over the last several years, several professors in the Department of Chemistry at the University of Central Oklahoma have given such a presentation to their students after having completed the first exam of the semester. At the end of the semester, the students take a standardized final exam written by the American Chemical Society (ACS), which we use to gauge student success. Records were kept of whether students received the presentation, their respective ACS final exam scores, as well as other relevant demographic information, and this information was used to create the dataset for this project. In order to determine if the presentation was impactful and has indeed improved student performance, we created several regression models to determine which variables are significant in predicting each student's ACS percentile rank. We expect to find that while there may be some correlation between a student's performance and his or her exposure to the presentation, there are several factors that are affecting each student's performance in the course. Our statistical models and results will assist the faculty of the Department of Chemistry at the University of Central Oklahoma in determining the next step in improving students' performance in General Chemistry I.

Mathematics and Science.Statistics.04

EthanBruegel, TracyMorris

University of Central Oklahoma

Division II Football Analytics

For our university's football team, one of their biggest competitors is Emporia State. We decided to comb through their play by play data to figure out if there are any consistencies in which plays occur at specific moments to aid our team. The play by play code was extracted from Emporia State's website and imported into R Studio where we used functions to create different variables such as side, offense, yards, to go, and receiver. Once we were able to get the variables we needed from one game, we went through all of the games and compiled the variables into a table. From there, we were able to get a better look at the data and find notable consistencies. We performed statistical tests to figure out if these consistencies were statistically significant. Hopefully the data and results will be of use to our football team in order to better prepare for one of their biggest rivals.

SihanDeng

University of Central Oklahoma

EVALUATING WHETHER EXPERT RANKINGS ON FANTASY BASKETBALL PLAYERS ARE ACCURATE

The major goal of this project was to compare expert rankings on fantasy basketball players with actual fantasy results at the end of the season. This might be an interesting problem because millions of people play fantasy sports and spend billions of dollars a year. First of all, we might expect that expert rankings on basketball players can correctly predict the final actual results. To answer this question, we collected data from online fantasy sports websites and compared expert rankings with actual results. We performed a correlation test to measure the relationship between expert rankings and final results. This project could be useful for people to help draft the best fantasy basketball team.

Mathematics and Science.Statistics.06

RebeccaHicks, OliviaCampos, TracyMorris

University of Central Oklahoma

The Interaction of Language Transfer and Language Processing in Second Language Acquisition

Project SCHOLAR (Statistical Consulting Help for Organizational Leaders and Academic Researchers) is a student statistical consulting service at the University of Central Oklahoma (UCO). SCHOLAR students work under the supervision of faculty from the Department of Mathematics and Statistics on various projects submitted from other researchers from both on and off campus. A faculty member from The English Department at UCO partnered with the students in Project SCHOLAR to study the influence of first language in learning a second language. Participants consisted of native speakers of English as the control group and native speakers of Arabic and Korean as the experimental groups. The participants were divided into three subgroups: elementary, intermediate, and advanced, based on level of English proficiency. The participants were then asked to rate a series of sentences on a 4-point scale from based on the correctness of the sentence. The reading times of the individual words will be used to develop a linear regression model predicting reading time from word length. An analysis of variance (ANOVA) will then be performed to test for differences in first language and English proficiency with respect to mean residuals from the regression model. Logistic and/or ordinal regression will also be performed to test for differences with respect to the sentence ratings.

Mathematics and Science.Statistics.07

JessicaSanders

University of Central Oklahoma

March Madness: A Statistical Analysis of Various Aspects of the Men's NCAA Basketball Tournament

This project examines various aspects of the NCAA March Madness men's basketball tournament. Each year 64 of the best division I men's basketball teams are selected to play in the tournament. The teams are divided into four regions and seeded from 1 to 16 with the 1 seed considered the best team in the region. The 16 teams in each region play a single elimination tournament resulting in the final four teams, who then play a single elimination tournament resulting in the national champion. Data were collected from Sport Reference (<https://www.sports-reference.com/cbb/postseason/index.html>). Variables include year, round, region, team names, scores, and seeds for each game in each tournament from 1985 to 2018. Aspects of the tournament that were analyzed include team dominance, wins vs. seeds, and upsets.

Mathematics and Science.Statistics.08

PatriciaSalas

University of Central Oklahoma

Exploration of Factors Influencing Low Birth Weight Infants in Oklahoma

This project analyzed the relationships between low birth weight infants (weighing less than 2500 grams) and characteristics of the mother and the birth. Oklahoma data for all live births in 2016 (n=52,592) was obtained from the CDC. Literature suggests several risk factors for low birth weight associated with the birth: less prenatal care, plurality (twin/triplet), males, early live birth order, and gestational age. Maternal risk factors include: young age, less education, race other than white, unmarried, smoking, pregnancy-associated or chronic hypertension, eclampsia, and diabetes. In addition, the study focused on comparing national natality statistics to those in the state of Oklahoma. Tables were used to summarize low birth weight for each of the dichotomous risk factors. Data was graphically summarized with regard to birth weight for age vs marital status, age vs race, race vs gender, and race vs education. Statistical tests included chi-square tests for significant differences in proportions and logistic regression modeling for predicting low birth weight.

ElenaOjeda

University of Central Oklahoma

A Tale of Two Models: A Non-Spatial and Spatial Regression Analysis of Poverty in Oklahoma

When data is associated with a spatial attribute, observed values of a variable at one location may influence values of that variable at neighboring locations. Failure to properly account for spatial dependence between observations in statistical models can produce biased coefficient estimates and compromise the quality of prediction. Spatial regression models incorporate this spatial dependence to produce more appropriate results. This project seeks to identify key determinants of poverty at a county and census tract level in Oklahoma using data from the U.S. Census Bureau's American Community Survey. I fit both a non-spatial and spatial autologistic models and test for the presence of spatial dependence in the residuals to determine which coefficient estimates are more appropriate. Spatial autocorrelation is tested for in the dependent variable using join-count statistics, which test the extent to which the spatial pattern in binary data are clustered, dispersed or random. I find that poverty rates in Oklahoma are spatially autocorrelated, and while the coefficient estimates for both models are not drastically different, the spatial autologistic model eliminates spatial autocorrelation in the county level model. These findings illustrate the value in examining and incorporating spatial attributes into regression analyses. Specifically, the Oklahoma spatial models will allow policy-makers interested in lowering poverty rates to understand how geography relates to poverty.

Gabriella Oliver, Tracy Morris

University of Central Oklahoma

A Statistical Analysis of a Screening Tool for Infant Safe Sleep Practices

Sleep-related infant deaths occur at a rate of approximately 3,500/year in the US. Many of these deaths could have been avoided had a safe sleeping environment been provided. Unsafe practices include bed sharing, using loose bedding, and exposure to smoking, among others. The focus of this project was to improve screening for unsafe sleep practices. In 2018, patients at a pediatric practice were assessed with the CDC's pregnancy risk assessment monitoring system (PRAMS) questions focused on infant sleep. At well-child checks (WCC) between birth and 6 months, caregivers were assessed with the PRAMS questions and were then given education specific to needs identified by the screening. One week after the WCC, participants received a phone call (CB) to identify whether changes were successful. During the CB, caregivers were rescreened with the PRAMS questions. Data were also mined from the same pediatric practice concerning caregivers who were not screened with the PRAMS questions (control group). We hypothesize that the use of the PRAMS questions will identify significantly more unsafe sleep practices, and that the education on safe sleep will significantly reduce the number of unsafe sleep practices. To address these hypotheses, chi-square tests and generalized estimating equations were used to determine if there are any relationships between unsafe sleep practices and variables including but not limited to socioeconomics, parental age, and infant age. Addition

DETERMINING WHAT INDIVIDUAL AND HOUSEHOLD FACTORS INFLUENCE FOOD CHOICE

People have different lifestyles and eat different things. It is interesting to talk about food choice because good nutrition is an important part of leading a healthy lifestyle. Moreover, the relationship between good nutrition and overall health is too important to be ignored. With that as motivation, we performed a study whose main purpose is to determine what individual and household factors influence people's food choice. To do so, we analyzed data from the National Household Food Acquisition and Purchase Survey which was conducted by the United States Department of Agriculture. Those data were based on different surveys done on multiple people living in the United States about their habits such as how many children they have, their financial situation, where they work and what they eat. We then analyzed the data for people living in the southern part of the United States, including Oklahoma, using many statistical tests such as chi-square test and then developed a multiple regression model in order to understand how their lifestyle and the food availability are related to their food choice. Our model produced results identifying details of which factors were the most significant in affecting food choice. These results are important because they might influence people's food choice, lifestyle, and even food companies to open in more locations.

Mathematics and Science.Zoology.01

ArissaMercer

Southwestern Oklahoma State University

The effects of behavioral interactions on the feeding habits of amphipod species

Species that use the same area and resources present a paradox for understanding species coexistence. This is especially true for cryptic species because they are phenotypically similar. This study examines three cryptic amphipod species (Sp. A, B, and C) in the genus *Hyalella* and how competition affects food preferences. Feeding habits of amphipods may be altered by interactions with other amphipod species by exploitation (one species being better at finding and using resources) or interference (physically excluding competitors). Species B is a better competitor than species C which are better at avoiding predators. However, we do not know the mechanism by which species B outcompetes the other species. We hypothesized that species A and C will use high-quality algae patches when alone and that species B will displace species A and C. Species were placed together in arenas containing foraging patches varying in algal content. Our results showed that species A and C spent more time on low-quality patch with species B, but species B was not dependent on the presence of species A and C. This study gives greater insight into the role of interspecific competition in shaping resource use and patterns of coexistence in nature. This study gives greater insight into the role of interspecific competition in shaping resource use and patterns of coexistence in nature.

Mathematics and Science.Zoology.02

IsabellaHadley, CaitlynBucher

Tulsa Community College

Studying the Effects of Sodium-Based Bait on Oklahoma Wildlife at Tulsa Community College

Sodium based bait has the potential to attract specific orders of animals, providing an opportunity to study these orders more closely. Animals require salt and can withstand high concentrations if fresh water is available. While physiologically necessary, excessive sodium chloride runoff is dangerous for wildlife and the environment. The purpose of this study was to test if Rodentia, Didelphimorphia, and Carnivora orders would be attracted to bait that contain higher levels of sodium as opposed to baits that contain less sodium. A motion-sensor camera was placed at the Southeast Tulsa Community College nature trail which includes a bottomland hardwood ecosystem in northeastern Oklahoma. Eleven bait types that varied in sodium concentrations from 0% to 2% were used throughout this study. Of the 502 capture trapped organisms visiting the camera trap in 30 days, 29% were Rodentia, 22% were Didelphimorphia, and 16% were Carnivora with 33% visits from "other"; vertebrates. "Other"; vertebrates included birds, turtles, and unidentified organisms. "Other"; vertebrates and Rodentia appeared in the traps less often with greater concentrations of salt present in bait. No significant correlation between sodium content and sightings were found in Carnivora and Didelphimorphia. Next steps include data collection of number of species and number of sightings with a series of varying concentrations of the same bait paste in the same geographic location.

Mathematics and Science.Zoology.03

MatthewLarson

University of Central Oklahoma

LeConte's Sparrows Co-Occur with Yellow Rails

The Yellow Rail (*Coturnicops noveboracensis*) is a small, secretive bird species that within the last decade has been found to winter in southeast Oklahoma in the Red Slough Wildlife Management Area. This bird is a species of conservation concern across its breeding range, but due to its reticent nature it can be difficult to determine if this organism occurs in an area. The objective of this project was to determine if the LeConte's Sparrow (*Ammodramus leconteii*) could be an indicator species for suitable habitat for the Yellow Rail. During the fall and winter of 2018/2019, we conducted field surveys at Red Slough Wildlife Management Area, Sequoyah National Wildlife Refuge, and the Texas Gulf Coast to search for these two species. Using the collected presence data, we created an occupancy model in R using the unmarked library. Our study sites had a 75.9% occupancy rate for LeConte's Sparrows, while the occupancy of Yellow Rails was 53.6%. Our sample size is small, but this suggests that LeConte's Sparrows may be a useful proxy for the presence of Yellow Rails in a given damp field, although LeConte's Sparrows may potentially occur in areas that are less suitable for Yellow Rails.

Mathematics and Science.Zoology.04

JenniferProphet, AmyHofeld

Southwestern Oklahoma State University

Timing of Avian Migration Onset Through the Oklahoma City Area 1995-2017 Using NOAA Weather Data

Avian migration timing and duration may be linked to large-scale climate patterns and reflect shifts in average global temperatures. The National Centers for Environmental Information (NCEI) provides an archive of NOAA weather radar data scans occurring every ten minutes dating back to 1995. Our primary data of interest are 1) reflectivity and 2) radial velocity. Aerial density and flight direction were collected for available years and compared to global temperatures to examine seasonal migration effects. We used KTLX (OKC) weather radar data to determine time, duration, intensity and direction of seasonal avian migrations. Fall migrations began in September and spring migrations in March between 1995-2017, while the global average temperature steadily increased by 2.358 °C. Fall migration trended toward later onset dates, while Spring migration trended toward earlier. Fall migration onset exhibits a stronger positive relationship with temperature than spring, potentially because inter-year March temperature patterns vary more than those of September. Ground truthing of radar data using eBird sightings revealed large-scale migratory events into Oklahoma during the second week of the fall migratory period. Comparatively, in spring migration there were constant departures from the region over the first five weeks of migration. This continuous rate of departures over time may also contribute to the weaker relationship between migratory onset and temperature in the spring.

Occupancy Model for Wintering Meadowlarks as a Proxy for Yellow Rails in Southeastern Oklahoma

Yellow Rails (*Coturnicops noveboracensis*) are a secretive rail species that winter in marshes along the Eastern and Gulf Coasts of the United States. In 2008, a wintering population of Yellow Rails was discovered in the damp grasslands of Red Slough WMA in southeastern Oklahoma. Due to their reticent, nocturnal nature, Yellow Rails are difficult to survey. However, we have noticed that Eastern Meadowlarks (*Sturnella magna*) often co-occur in fields with Yellow Rails. We hypothesized that Eastern Meadowlarks may act as an indicator species for the presence of Yellow Rail. We conducted monthly surveys in fields at Red Slough WMA and Sequoyah NWR survey sites beginning in October. We surveyed the units by slowly dragging a rope with noise-making bottles across the field, flushing out species of interest. We recorded each Yellow Rail and meadowlark flushed, and then conducted an occupancy model with the survey data using Program R. We found that Eastern Meadowlarks were present in more fields than Yellow Rails, with Eastern Meadowlarks occupying 0.751 \pm 0.217 of the fields surveyed, while Yellow Rails occupied 0.526 \pm 0.268 of the fields surveyed. There was only a weak correlation ($\phi = 0.13$) with observations of Eastern Meadowlarks and Yellow Rails. This indicates that Eastern Meadowlarks may not necessarily be the best choice as an indicator species for the presence of Yellow Rails.

AmberLemons

University of Central Oklahoma

Sedge Wren Occupancy Modeling for Species Indicator

In recent years, Oklahoma's wintering population of Yellow Rails (*Coturnicops noveboracensis*) has declined, with a dramatic population crash since 2010. Because Yellow Rails are nocturnal and secretive, it can be difficult to assess whether they occur in an area without time-consuming nocturnal research. We have noticed that damp, grassy fields that contain Yellow Rails also frequently contain Sedge Wrens (*Cistothorus platensis*). Therefore, we hypothesized that the Sedge Wren could be a potential indicator species for the Yellow Rail. We engaged in monthly surveys starting in October 2018 for these species at Red Slough Wildlife Management Area and Sequoyah National Wildlife Refuge. Surveys were conducted at night using the rope drag method in order to flush the nocturnal rails. Any Yellow Rails and/or Sedge Wrens spotted were then caught, banded, and released. We conducted an occupancy analysis on the resulting data using the unmarked package in R. The occupancy rate for Sedge Wrens was 0.789 ± 0.236 , while the occupancy rate for Yellow Rails was 0.526 ± 0.268 . There was only a weak correlation between the observation of Sedge Wrens and the observation of Yellow Rails ($\phi = 0.35$). Sedge Wrens appear to occupy a wider range of habitats than Yellow Rails, and so we feel that the use of Sedge Wrens as indicator species for Yellow Rails would not be an effective method to identify potential Yellow Rail habitats.

Mathematics and Science.Zoology.07

AustinJones, ChrisButler

University of Central Oklahoma

A Comparison of Yellow Rail Habitats in Southeastern Oklahoma and Coastal Texas

Yellow Rails (*Coturnicops noveboracensis*) typically use wet meadows near the Gulf Coast of Texas and other southern states in both inland and salt marsh habitats during the non-breeding season. Yellow Rails have been observed wintering in southeastern Oklahoma for at least a decade and during 2008/2009 the density was comparable to the density in Texas. However, the population crashed after 2010, and there have been 92.5% fewer Yellow Rails found annually at Red Slough WMA in McCurtain County from 2011 to 2018. In contrast, no changes in populations wintering along the Gulf Coast have been reported. Changes in habitat suitability due to succession are the suspected cause. We took vegetation measurements under the BBIRD grassland bird sampling protocol at several of these sites and compared the results to measurements taken in Texas. The presence of Yellow Rails in Oklahoma and Texas was positively correlated with the number of stems at 10, 20, and 30 cm as well as the amount of green cover. However, fields in Texas with Yellow Rails had significantly more stems at 20 and 30 cm in Oklahoma. We suspect that the decline in rails wintering in Oklahoma may be linked to changes in the number of stems at 20 and 30 cm. We propose adopting a more intensive habitat management plan for certain sites at Red Slough with the goal of restoring the habitat to something similar to freshwater sites in Texas.

Mathematics and Science.Zoology.08

DaniWhiting, ZachJones

Southwestern Oklahoma State University

Overwintering Raptor Perch Locations and Types in Southwestern Oklahoma.

Overwintering raptor species use a variety of hunting methods and perching types to search for prey in the agricultural landscape surrounding Weatherford, OK. Our primary objective was to identify species preferences for perch types (primarily a range of power transmission line pole sizes and materials, as well as pole density) and landscape context (tilled, non-tilled pasture, woodland, man-made structures other than power poles) near hunting locations. Two 48-km routes were sampled beginning in fall 2018, one north and one south of Weatherford, OK. Preliminary data show the following trends: American Kestrels (*Falco sparverius*) used wires between poles most often; Red-Tailed Hawks (*Buteo jamaicensis*) did not indicate a preference for perch type; juvenile Bald Eagles (*Haliaeetus leucocephalus*) were observed in tall trees; and Northern Harriers (*Circus cyaneus*) were only seen in flight. Additionally, all species used areas with little to no presence of man-made structures other than utility poles. Species differences in hunting methods and perch types may mitigate competition for common prey items (rodents) the winter, and the presence of utility poles may support increased abundances of some species populations beyond what would otherwise be possible. These preliminary data indicate that both American Kestrels and Red-tailed Hawks may benefit from the presence of utility poles and lines.

DavidBass

University of Central Oklahoma

An Examination of the University of Central Oklahoma Natural History Museum: Caribbean Aquatic Invertebrate Collection

The Invertebrate Section of the University of Central Oklahoma Natural History Museum (UCONHM) hosts a large and diverse assemblage of specimens, including the Caribbean Aquatic Invertebrates Collection. This special collection contains specimens collected by David Bass and several colleagues, beginning in 1990 and continuing through today. These invertebrates were encountered in a variety of aquatic habitats including ponds, lakes, reservoirs, streams, rivers, springs, caves, groundwaters, and phylotelmata throughout the Caribbean region. Most specimens have been identified to the genus level while others have been identified to the species level. To date, almost 400 collections have been made from 16 small Caribbean islands, resulting in 231 taxa being documented. Species similarity comparisons between the pairs of islands revealed the greatest values occurred with islands in close proximity to each other and having similar terrain. Dominant groups included arthropods and mollusks. Most of these collections represent the only research efforts examining the aquatic invertebrate fauna on many of these islands, thus, making this collection quite unique. Specimens are often loaned to other researchers for inclusion in their studies. In addition, more than 20 publications have resulted from specimens deposited in this collection.

Jennifer Staggs

Southwestern Oklahoma State University

Micro-Islands in Oklahoma? Species-area relationships in lichen invertebrate communities.

Species-area relationships are well studied in many ecosystems, especially islands, and consistently show an increase in species richness as the area increases. Species-area curves generally show an increase in species richness as area increases until the regional species pool is exhausted. We examined species-area relationships in lichen invertebrate communities to deepen the overall understanding of these less studied micro-communities. We hypothesized that lichen patches would display the same species-area distribution trends documented in other isolated communities, such as islands. Lichen samples were collected from three trees on the main campus of Southwestern Oklahoma State University in Weatherford, Oklahoma. Five lichen patches were randomly selected from a similar location on each tree. A perimeter measurement and sample of each lichen patch was obtained. The samples were hydrated, then agitated to expel the organisms from the solid matter. Each patch was individually examined under a compound microscope, documenting morphospecies and abundances. We discovered that the species-area relationship of lichen communities did not produce the classic sigmoidal curve. Species accumulation in lichen invertebrate communities may not be governed by the same underlying processes as other isolated communities.

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Evolutionary consequences of anthropogenic environmental change: the effects of nutrient pollution on sexual selection in amphipods

Sexual selection is a powerful mechanism of evolutionary change in populations. Sexually selected traits tend to be expensive to produce and thus are expected to be very sensitive to poor environmental conditions. In this study, we looked at patterns of sexual selection in amphipods in genus *Hyaella* (small crustaceans). The populations studied are found in natural lakes in Pennsylvania. The lakes vary in levels of nutrient pollution due to differences in surrounding agricultural land use. Samples of both mating pairs and single amphipods were collected from each lake. We focused on two sexually selected traits: gnathopods (claw-like appendages) and antennae. We predicted that patterns of sexual selection would differ across lakes because of differences in the availability of nutrients used to build expensive mating traits. Our study will provide insight into how human impact can cause changes in the environment, which affect environmentally sensitive traits. This research can potentially fill gaps in current knowledge about evolutionary implications of human impact on natural population.