



Pittsburg State University

Student Research Abstract Writings Spring 2018

Category



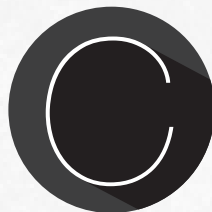
Oral or Poster:
Sciences and
Technology

Category



Oral or Poster:
Business,
Education and
Humanities

Category



Oral or Poster:
Creative Works

Category



Poster:
Topical Literature
Review

Category



Poster:
High School

Colloquium

Table of Contents

Oral Presentations.....	5
Oral A	5
Oral B	13
Oral C	22
Poster Presentations	25
Poster A	25
Poster B	47
Poster C.....	53
Poster D	55
Poster E	69
Index	83

Oral Presentations

Category



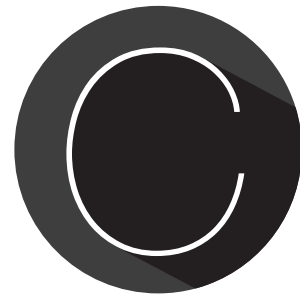
Sciences and
Technology

Category



Business,
Education and
Humanities

Category



Creative Works

Student: Ahlam Alghamdi

Student Status: Graduate

Major: Chemistry

Advisor: Dr. Ram Gupta

Title: Cobalt Oxide Decorated Polypyrrole: A Bi-functional Material for Energy Applications

Time: 8:30am - 9:30am

1

Abstract:

The main objective of this study is to synthesize nanostructured cobalt oxide decorated on polypyrrole using a facile method for energy applications. For this, polypyrrole was first synthesized using a chemical polymerization method. In the second step, a varying amount of cobalt oxide was decorated on polypyrrole using a hydrothermal process. The synthesized materials were structurally and electrochemically characterized. It was observed that the electrochemical properties of the composites depend on their composition. The optimized composition showed a maximum specific capacitance of 1533 F/g at 1 mV/s with a significant electrochemical stability. The composite retained ~87% of its initial charge storage capacity even after 5,000 cycles of charging-discharging studies. Moreover, these composites showed outstanding performance as an electrocatalyst for oxygen and hydrogen evolution reactions. It required an overpotential of 316 mV and 132 mV to achieve a current density of 10 mA/cm² for oxygen and hydrogen evolution reactions, respectively. Our results suggest that composites of cobalt oxide and polypyrrole can be used as bi-functional materials for energy applications such as for supercapacitor and electrocatalyst for water splitting. Furthermore, cobalt sulfide was synthesized using the previous composite (not carbonized) to compare the water splitting activities for both cobalt oxide and cobalt sulfide. A clear improvement was obtained for cobalt sulfide based on oxygen evolution reaction and hydrogen evolution reaction.



Student: Michael Barnes

Student Status: Graduate

Major: Biology

Advisor: Dr. Andrew George

Title: Stand-level Density and Nesting Success of Bird Species in Response to Experimental Forest Management in the Missouri Ozarks

Time: 8:30am - 9:30am

2

Abstract:

Forest bird populations in North America have undergone declines since at least the 1960s. However, few studies have examined the long-term effects of forest management on bird population demographics. We analyzed the effects of even-aged, uneven-aged, and no harvest management on the densities and nesting success of 11 bird species, using 15 years of treatment data from 9 landscape-scale experimental forest plots in the Missouri Ozarks. Mature forest and early-successional bird species responded differently to treatment type and time since harvest. Nesting success did not differ at the site-level, but stand-level analyses are in progress. Conservation of bird populations in forested regions will require consideration of long-term, large scale management practices.



Student: Ren Bean

Student Status: Graduate

**Group Members: Shrikant Anant, Quentin Austin, Tuhina Banerjee, Laci Hadorn,
and Shuguftha Naz**

Major: Polymer Chemistry

Advisor: Dr. Santimukul Santra

Title: Personalized Drug Cocktail-Carrying Nanomedicine for the Treatment of Cancer

Time: 8:30am - 9:30am

Abstract:

Prostate cancer is the most common cancer in men, with 1 in 7 men being diagnosed in their lifetime. Hsp90 is a key molecular chaperone involved in cell signaling, proliferation, and survival, and therefore a promising target for therapeutic intervention. Inhibition of Hsp90 suppresses androgen signaling, promoting degradation of client proteins resulting in apoptosis. Both geldunin and celastrol disrupt the function of Hsp90 through unique pathways. The co-chaperone Cdc37 mediates the loading of protein kinase onto Hsp90, and the natural product celastrol disrupts Cdc37-Hsp90 complex formation. The natural product geldunin inhibits p23 chaperoning activity, blocking its cellular interaction with Hsp90. Studies have shown the anticancer activities of geldunin on several lines of cancer including melanoma, prostate, and human breast cancer cells. Herein, a novel, folate functional magnetic nanomedicine encapsulated with Hsp90 targeting drug cocktail, geldunin and celastrol, will be used for effective treatment of cancer. This MR nanotheranostics will be specifically used as the targeted drug delivery platform to deliver drugs to tumor. In this study, geldunin and celastrol carrying iron-oxide nanoparticles was formulated for the targeted treatment of prostate cancer. Effective drug delivery using targeted nanomedicine formulations, and various biomolecular and cellular anti-tumor activity will be discussed in this presentation.



Student: Sanket Bhoyate

Student Status: Graduate

Group Members: J. Chen, M. Ionescu, P. K. Kahol, and S. R. Mishra

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: Reactive Flame Retardants for Bio-derived Polyurethane Foams

Time: 8:30am - 9:30am

Abstract:

Polyurethane foams are in general flammable and their flammability can be controlled by adding flame retardant materials. Reactive flame-retardants have the advantage of making strong bond within the polyurethane chains to provide excellent flame retardancy over time without compromising physico-mechanical properties. Here, phenyl phosphonic acid and propylene oxide (PPA-PO) based reactive flame-retardant (FR) polyol was synthesized and used along with limonene based polyol for preparation of flame-retardant polyurethanes. All the obtained foams showed higher closed cell content (above 96%) with minor effect on cell morphology. By addition of FR-polyol, the compressive strength of the foams showed 160% increment which could be due to reactive nature of FR-polyol. Moreover, 1.5 wt% of P content reduced the self-extinguishing time of the foam from 81 seconds (28% weight loss) to 11.2 seconds (weight loss of 9.8%). Cone test showed 68.6% reduction in peak heat release rate along with 23.4% reduction in thermal heat release. The change in char structure of carbon after burning was analyzed using Raman spectra which, suggests increment in the graphitic phase of the carbon over increased concentration of phosphorus. It can be concluded from this study that phosphorous based polyol could be blended with bio-based polyols to prepare highly flame retardant and superior physico-mechanical rigid polyurethane foams.



Student: David Hollie
Student Status: Graduate
Major: Biology

Advisor: Dr. Andrew George

Title: Avian Community Response to Experimental Forest Management in the Missouri Ozarks

Time: 8:30am - 9:30am

5

Abstract:

In recent decades, concern for migratory birds has stimulated research aimed at understanding the relationship between forest management and bird populations. We report on the long-term effects of three silvicultural practices on bird community structure in upland hardwood forests. Three silvicultural treatments (even-aged, uneven-aged, and no harvest) were randomly assigned to three sites each (mean area = 400 ha) under a 100-year rotation with a 15-year re-entry period. Data on breeding bird density were collected 5 years pre-harvest (1991-1995) and 14 years post-harvest (1997-2010). Early successional species increased significantly in even- and uneven-aged sites 3-5 years post-treatment with the greatest changes in even-aged sites, but densities 12-14 years post-treatment did not differ from pre-treatment densities. Our findings could enhance management plans aimed at the conservation of early successional avian communities.



Student: Katie McMurry
Student Status: Graduate
Major: Biology

Advisor: Dr. Christine Brodsky

Title: Bird and Butterfly Species Richness Increase in Residential Yards Managed for Vegetation Complexity in Southeast Kansas

Time: 9:30am - 10:30am

6

Abstract:

Urbanization is a major cause of habitat loss worldwide, consequentially decreasing native plant, butterfly, and bird diversity. Residential yards and gardens are often the dominant greenspaces remaining in cities, and they may range extensively in landscaping style, maintenance, and contents due to the resident's preferences and gardening goals. This study aims to understand which aspects of residential gardens best support diversity in bird and butterfly communities by assessing trends in homeowner perceptions, preferences, and gardening practices. Between May and August 2017, 47 residential yards and gardens were surveyed in Pittsburg, Kansas. Each yard was surveyed for its plant species composition and structure, and three butterfly transects and bird point counts were conducted to assess community composition and diversity. Homeowners are currently being surveyed for their gardening practices, environmental knowledge, and other sociodemographic factors. An average of 11.5 bird species and 5 butterfly species were observed per residential garden, and preliminary findings show positive relationships between urban exploiter bird species (i.e., European Starlings) and gardens with fewer plant species and simple vegetation structure. Bird communities also seem to separate out by the homeowner's income, indicating a potential luxury effect surrounding urban biodiversity in residential gardens.



Student: Eric Mullins

Student Status: Graduate

Major: Physics

Advisor: Dr. Benjamin Tayo

Title: Computational Studies of Copolymers Containing Ferrocene and Imidazole

Time: 9:30am - 10:30am

7

Abstract:

Electrochemical and UV-Vis studies on polymers containing ferrocene and imidazole have revealed significant modifications in the electrochemical properties and absorption spectra which could be attributed to the ability of the of the imidazole to coordinate with transition metals, increasing its electron deficiency and enhancing oxidization of the nearby ferrocene moiety if it is in close proximity with imidazole. Using density functional theory (DFT) in order to optimize the structure spatially. This optimization is an accurate representation of the structure due DFT's approximation of a multi electron atom. With an approximation of two and three polymer segments we obtained a representation of the molecular energy of the system. Additional calculations of the polymer chains were conducted with different metals to compare with spectra in order to characterize the geometry of the polymer. In this presentation, we will discuss the process involved in performing a geometry optimization calculation, from building the initial geometry, to post-processing and interpretation of results in order to extract useful information such as bond lengths, frontier energy levels, and electron density plots.



Student: Zachary Shaw

Student Status: Graduate

Group Members: Tuhina Banerjee, James Beach, Richard Gross, Jyothi Kallu,
and Lok Shrestha

Major: Polymer Chemistry

Advisor: Dr. Santimukul Santra

Title: Revolutionary Treatment for Prostate Cancer: A Combination Approach Using TNF- α
and Sophorolipids

Time: 9:30am - 10:30am

8

Abstract:

Prostate cancer is one of the most prevalent forms of cancer afflicting men in the United States. In recent years, advances in the field of nanotechnology have allowed for new and innovative ways to treat various types of cancer and various other diseases. Our research focuses on the treatment of the prostate cancer utilizing iron oxide nanoparticles (IONPs) loaded with TNF- α and lactonic sophorolipids (LSLs). TNF- α is a cytokine responsible for apoptosis initiation, while LSLs are natural glycolipids shown to alleviate inflammation and improve immune response in certain diseases. We hypothesized that this combination may possess a synergistic effect, displaying greater therapeutic effects than either compound alone. We synthesized polyacrylic acid (PAA)-coated IONPs to serve as a vehicle for these compounds for target-specific delivery. The surface carboxylate groups of the PAA coating can be chemically modified, allowing for binding of ligands to target cell-specific surface receptors or antigens. We conjugated our IONPs with glutamic acid with the aim of targeting the over-expressed PSMA receptors on the surface of the LNCaP cells. This combination therapy showed significant LNCaP cell death within 48 hours of incubation, while healthy cells were unaffected. The therapeutic effects were determined using cytotoxicity, ROS, apoptosis, and migration assays. The results of the combined therapy suggest that these compounds may be a viable alternative to chemotherapeutic drugs in prostate cancer treatment and will be highlighted in this presentation.



Student: Chunyang Zhang

Student Status: Graduate

Group Member: Sanket Bhojate and Dr. Pawan Kahol

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: Effect of Additive and Reactive Flame Retardants on the Physicomechanical and Flammability of Biobased Rigid Polyurethane Foams

Time: 9:30am - 10:30am

9

Abstract:

Polyurethanes are an important class of polymers which are being used for various industrial applications. In general, polyurethanes are prepared using polyols and diisocyanates. Most of the polyols used by industries are petrochemical based. In this project, a bio-based polyol using an orange peel oil-based derivative, limonene dimercaptan, was synthesized by the one-step photochemical thiol-ene reaction. The synthesized bio-based polyol was used to prepare flame retardant polyurethane foams using dimethyl methyl phosphonate (DMMP) as an additive flame retardant (AFR) and a bromine-containing polyol as reactive flame retardant (RFR). Flame retardant polyurethane foams with different amount of DMMP and bromine polyol were prepared and analyzed. Our results suggest that prepared polyurethanes showed moderate density and high closed cell content. Both flame retardants lead to rigid polyurethane foams with excellent physicomechanical properties with a short self-extinguishing time and with low weight loss after burning. The reactive bromine polyol leads to rigid polyurethanes with better physicomechanical properties than those of foams based on AFR with phosphorous, but the flame retardant properties of foams prepared using AFR were superior to the foams prepared using bromine polyol. From the overall observation, the reported polyurethane foams showed efficient flame retardant properties and can be used for rigid flame retardant foam applications.



Student: James Burlingame

Student Status: Undergraduate

Major: Mathematics

Advisor: Dr. Yaping Liu

Title: The Columbo Puzzle

Time: 10:30am - 11:30am

10

Abstract:

We begin with an elegant solution to a puzzle and then see a rapid escalation to uncontrolled, random solutions as we add complications to the puzzle. This problem is deeply rooted in number theory and depends on our knowledge of Sidon sets. We will provide solutions to the questions drawn and also ask open ended questions for which no solution exists. We will also ask the audience to participate in the fun of solving the initial puzzle.



Student: Avery Coronado
Student Status: Undergraduate
Group Members: Seth Bohlken, Gage Fox, Thomas Prater, Eric Schlange,
and Landon Stephens
Major: Mechanical Engineering Technology
Advisor: Mr. Brock Skaggs
Title: Walker Team
Time: 10:30am - 11:30am

11

Abstract:

This report looks at the Pittsburg State University (PSU) linkage vehicle senior design and manufacturing class project. This requires the students to design and manufacture a vehicle that uses a walking motion for transit, as opposed to wheels, through a system of linkages. The linkage vehicle project has never been attempted at PSU, so no previous work from years past was available, which left many unknowns for the students. The Klann Linkage and Theo Jansen Standbeest walking mechanisms are well known existing methods that were researched. The Klann Linkage is the basis of the design, but other requirements and alterations were also determined. Some of the requirements include but are not limited to the vehicle size, weight, carrying capacity, step height, incline ability, an attached arm, arm reach, end effector specifications, wireless control, and an obstacle course. The main components of the linkage vehicle are the frame, the drive mechanism, the walking mechanism, the arm and the end effector. To meet the prescribed requirements, the components of the project were designed to perform their specific tasks and to withstand the accompanying loads and stresses they will undergo during such activities. These were calculated using a combination of hand calculations, SolidWorks (SW) Finite Element Analysis (FEA), and reference formulas. The movement of the walking linkage was determined using SW assembly mate constraints and motion study analysis. All computer aided parts that will be manufactured and vehicle assemblies were made using SW. The combination of stress analyses and motion studies indicate that the linkage vehicle is ready for construction.



Student: Gabriela Gumucio
Student Status: Undergraduate
Group Members: Katlin Dusing, Bethanne Elliott, Tara Gire, Rebecca Henderson,
Kaylin Lake, Karlie Lower, Mattson Steele, Jasmine Tindle, Kimberly Yohe,
and Rae Zeller
Major: Communication
Advisor: Dr. Alicia Mason
Title: Opportunities for Departmental Strategic Planning
Time: 10:30am - 11:30am

12

Abstract:

The COMM 765: Strategic Planning & Communication Campaigns course conducted research on behalf of the Department of Communications to inform the future 2018-2023 planning and goals for the department. A quantitative survey was designed to examine key stakeholder groups including: faculty, staff, donors, current students and alumni. Each stakeholder group received a unique set of research questions. For example, donors were surveyed to determine their willingness, interest and knowledge of how to support department initiatives through the PSU Foundation; while current students were asked to share their thoughts on the effectiveness of current student organizations, and perceptions toward course developments and availability. All groups were provided with qualitative questions for gathering open-ended feedback. This oral presentation reports the findings from this study.



Student: Lewis Moore
Student Status: Undergraduate
Group Members: Derek Hansen, Blake Hettinger, Derek Robertson, Lucas Wilson,
and Yung Xie
Major: Manufacturing Engineering
Advisor: Dr. David Miller
Title: Canoe Trailer
Time: 10:30am - 11:30am

13

Abstract:

The current canoe trailer being used at Pitt State makes loading and unloading of the canoes difficult for our clients. The HHPR department uses the canoes multiple times a year for class and there is not always enough people there to properly unload and load the canoes with the current trailer. The second problem they presented us was that they don't always want to have to take all 6 canoes to the body of water. They would like to have an efficient way to transport 1 canoe at a time from the shed to the body of water. Our team's goal was to design and manufacture a trailer that would store all 6 canoes in the shed by the President's Pond, and give our clients an easy way to load and unload the canoes when they need to be used. We also wanted to provide some sort of transport cart that our clients could easily transport 1 canoe at a time from the trailer to the pond.



Student: Nathaneil Skinner
Student Status: Undergraduate
Major: Biology
Advisor: Dr. Andrew George
Title: Seasonal Population Trends of the Gray Bat Colony in Pittsburg, Kansas.
Time: 10:30am - 11:30am

14

Abstract:

White-nose syndrome (WNS) is an emerging fungal disease that infects several bat species, including the federally endangered gray bat (*Myotis grisescens*). Kansas' only known gray bat colony has not been monitored since the discovery of WNS in North America. We initiated a study to determine the status and population trends of the local colony. While our method of estimating the emerging bats was different than previous studies, ours had the most definitive results based on counting methods and potential for human error. We also trapped bats with a harp trap, tested individual bats for WNS, and observed the roosting sites for evidence of WNS. We found that the population has persisted, but abundance was generally lower than historical records. On three separate occasions the population peaked and then slowly decreased. After the second population peak, we documented a shift in roost sites in late summer, as the gray bats moved from the maternity roost site to another location, where they remained until fall. There were no indications of WNS on any of the bats we observed. Our population trend data is incomplete from lack of historical data, but a new population trend is being developed with ongoing data being collected each season.



Student: Jordyn Bollinger
Student Status: Graduate
Major: Professional Writing
Advisor: Dr. Jessica Jorgenson-Borchert
Title: Needs Assessment of International English within PSU's Online Information
Time: 8:30am - 9:30am

15

Abstract:

The following document contains a Needs Assessment for International English within Pittsburg State University documentation, specifically digital documentation produced by the Office of International Services and Programs on their PSU web pages. The online material presented through PSU's web pages does not currently follow the style of International English or English as a Lingua Franca (ELF). Based on surrounding research of ELF and International English, information that is presented in International English is better understood by the most number of native and non-native speakers of the English language. Because PSU's online information is not presented in this way, this Needs Assessment will determine whether first-year international students fully comprehend material that is not produced in International English. This needs assessment will look at two groups of first-year international students from two sections of ENGL 100 and ENGL 101 English Composition for International Students. These students will voluntarily be asked to complete three tasks: 1) read the information pulled from PSU's web pages, 2) interpret/summarize the information presented to them, and 3) express any confusion or difficulty they had with the excerpt. These responses will be cross-analyzed to determine what information is confusing (if any) to the most number of participants. If the study shows a correlation between confusion/difficulty in comprehension and material that is not presented in International English, my analysis will suggest that International English can help decrease confusion among ESL learners based on the surrounding research and pedagogy of the style.



Student: Chelsey Davenport
Student Status: Graduate
Major: HHPR
Advisor: Dr. Scott Gorman and Mrs. Laura Covert
Title: Mobility and Aging: The Benefits of Incorporating Yoga Amongst Seniors
Time: 8:30am - 9:30am

16

Abstract:

Aging happens to everyone on different levels. As we get older our bodies naturally have the tendency to lose flexibility and our joints become less mobile and rigid. One must continue to move in ways that allows the body to stay active in a healthy and obtainable way. This paper will discuss the importance of physical fitness for senior citizens while incorporating yoga into daily life. I will focus my research on the mental and physical effects of how yoga can help older adults with symptoms of arthritis, disease and illness, while using breathing exercises for overall better relaxation and health. I will examine the parts of the brain that triggers good endorphins that make one feel better after exercising and I will give many examples of how yoga postures, and new visual technology can benefit the older population and encourage movement and mobility. This paper will demonstrate the numerous benefits of how exercise and yoga can enhance your life and keep you active way into your later years.



Student: Lynzee Flores

Student Status: Graduate

Major: Communication

Advisor: Dr. Alicia Mason

Title: Public Opinion & U.S. Foreign Policy: Investigating the Impact of Political Television Dramas on Audience Perceptions of Current U.S. Foreign Policy Engagement and Effectiveness

Time: 8:30am - 9:30am

Abstract:

Political TV dramas have become increasingly popular with audiences as a source of entertainment after the 2016 presidential election, particularly programs depicting the functions of the executive branch of government (CenturyLink, 2017). This research investigates how political TV dramas, as compared to network news coverage of U.S. foreign policy events, influence the perceptions, attitudes, and beliefs of U.S. audience viewers. Using agenda-setting as the theoretical frame, this study employs a quantitative experimental design in order to measure participants' pre- and post- attitudes on four variables; knowledge of U.S. foreign policy events, impression of U.S. diplomacy tactics, the persuasiveness of media content, and examines changes in public support for diplomatic foreign policy efforts. Participants additionally reported the perceived source credibility, media usage habits, and frequency of exposure to political dramas and nightly news. Materials and measures received approval from the Institutional Review Board (IRB). Voluntary participants were recruited from introductory communication and political science classes from a Midwest university. Participants viewed one episode of the political TV drama, *Madam Secretary*, as well as a news story covering a similar, real life event. The presentations were systematically rotated to avoid ordering effects and a control group was included for research integrity. A survey instrument was used to gather the data related to the hypothesis and research questions advanced in the study. The findings report how audience attitudes are impacted by dramatic depictions of U.S. foreign policy events compared to nightly network news. Limitations, discussion and future directions will be addressed.



Student: Joshua Horton

Student Status: Graduate

Group Members: Alex Battitori, Tyler Breedlove, Morgan Ebbs, Courtney Schlund
and Chanda Williams

Major: English

Advisor: Dr. Celia Patterson

Title: Too Many Cooks: Redesigning the English Program Website

Time: 8:30am - 9:30am

Abstract:

The purpose of this project was to produce new content for the English Program webpages for Dr. Patterson's course, ENGL 875 Seminar: Writing for the Web. Throughout all stages of this project, we consulted Janice Redish's book Letting Go of the Words. The first stage of the project was to identify the webpages' target audiences; this was achieved through the creation of personas that reflected the demographics of users. Through these personas, we developed a series of tasks for a preliminary usability test. Subsequently, we conducted the preliminary test on the existing English Program webpages using test subjects that reflected these audiences. The failing test results revealed issues with accessibility, consistency, and optimization. In response, we audited the existing content, which involved cataloging the information on each page. Next, we created new content that fit the parameters we developed. Finally, we assessed the effectiveness of this content through extended workshops. After finalizing the content, we created mock-up webpages to simulate the user experience. The final stage of our project was implementing the content into the program webpage. With this new webpage, we hope to improve the user experience and attract more students to not only the English Program but to the university at large.



Student: Michaela Joines

Student Status: Graduate

Major: Communication

Advisor: Dr. Troy Comeau

Title: Corporate Sponsorship and University Campuses: Determining the Effectiveness of
University Sponsorship Efforts at Pittsburg State University

Time: 8:30am - 9:30am

Abstract:

A multi-phase study was completed to determine the effectiveness of corporate sponsorship efforts at Pittsburg State University. Pittsburg State engages in corporate sponsorship to partner with local and national companies, seeking to benefit both the university and its partners. The study sought to find factors that improve the effectiveness of such sponsorship efforts as determined by stakeholders' ability to recall sponsors, differences in attitudes toward national sponsors versus local, and how brand attachment to the university or sponsoring brands effects their perception of the sponsorship alliance. Phase 1 included interviews with stakeholder groups (students, faculty/staff, alumni, and community members) and functioned as the pre-test and formative research that informed a later quantitative study. Phase 2 included a survey distributed to stakeholder groups to gauge attachment, attitudes, and behavior. All materials and measures were approved by the Internal Review Board. The data was gathered online using Qualtrics software through the Communication Research Lab. Findings and limitations will be presented, along with implications for corporate sponsorships in higher education systems.



Student: MacKenzi Tims

Student Status: Graduate

Major: Communication

Advisor: Dr. Alicia Mason

Title: Political Satire: Changing the Landscape of Political Information Dissemination Among Millennial Voters

Time: 9:30am - 10:30am

20

Abstract:

The proposed quantitative research will examine the shift in news seeking habits from traditional sources to new, nontraditional media outlets by Millennials (Generation Y) in the modern American society using the Uses and Gratifications Theory. The focus of the study is on the use of the late night comedy and satirical news sources as primary information seeking channels for news dissemination between the ages of 18 to 29. Participants will consist of a minimum of 100 students who attend a Midwestern university with a student body of approximately 7,500 students. Participants will be chosen using a convenience sampling method and will be asked to complete an anonymous survey. The proposed research will call to attention the methods that are frequently used by Millennials to obtain information regarding their source of attaining political knowledge, attitudes and beliefs.



Student: Matt Bonner

Student Status: Undergraduate

Major: Economics

Advisor: Dr. Michael Davidsson

Title: Application of the Panzar-Rosse Model: An Analysis of the Brewery Industry in the U.S.

Time: 9:30am - 10:30am

21

Abstract:

Waves of mergers and acquisitions has left the brewery industry in the United States considerably concentrated. The top two firms, Anheuser-Busch InBev and MillerCoors control more than 60% of the market share. It has become very important to assess the level of competition within the industry. The Panzar-Rosse model is an assessment of competitive conduct that has been widely used to study the competitiveness of the banking industry. The associated measure of competition, called the H-statistic, is obtained as the sum of elasticities of gross revenue with respect to input prices. For this study, the Panzar-Rosse model will be applied to the United States brewery industry and finds that the H-statistic has a negative value, meaning the industry operates under a neoclassical monopolist style or a collusive oligopoly.



Student: Evan Burke
Student Status: Undergraduate
Major: Elementary Education
Advisor: Mrs. Angela Abbott
Title: A Case for a Classical Education
Time: 9:30am - 10:30am

22

Abstract:

Since the Middle Ages education has been primarily rooted in the Liberal Arts. Over the past 100 years, we have seen a shift to an education that has a strong emphasis given to reading and mathematics. Due to this, educators have had to sacrifice a well-balanced education, especially within the disciplines of philosophy and the humanities, in order to satisfy the curriculum put forth by their Board of Education. I believe that there is a direct correlation between the absence of a Liberal Arts education and the rise of broken homes and mental health illness. We are not properly probing the minds and hearts of our students and I would suggest that the two most important questions our students should be asked are as follows: 'Why is there something rather than nothing?' and 'What is my purpose?' Educators of the first schools understood they were charged with the duty of guiding their students along the magnanimously wonderful adventure that satisfies these questions. We must have a return to a classical education, one that probes the mind and heart. Education stands on two pillars: academia and character. Therefore, let us not build upon one without regards to the other but rather keep balance and develop the whole student. Within my presentation, I will explain, in greater detail, the need for a revival of the Liberal Arts, and give a reasonable solution as to how educators and schools can implement these ideas.



Student: Amanda Bustamante
Student Status: Undergraduate
Major: Communication
Advisor: Mrs. Kristen Livingston
Title: The Foster Care System and its Effects
Time: 9:30am - 10:30am

23

Abstract:

A Social Learning study on the long term affects of the Foster Care System, which is a substitute care for children who are placed away from their parents or guardians, and for whom the State agency has placement and care responsibility. This includes, but is not limited to, placements in foster family homes, foster homes of relatives, group homes, emergency shelters, residential facilities, childcare institutions, and pre-adoptive home. Twenty-five thousand kids leave the system each year; this is their take on life and the system in which they experienced. Each has different circumstances, which influences their journey throughout the System. This study focuses on personal experiences, advocates of all backgrounds, laws, reform, justice, and long term affects.



Student: Rece Dawson

Student Status: Undergraduate

Major: Finance/Economics

Advisor: Dr. Michael Davidsson

Title: Anticipations with the Personal Savings Rate: An Outlook in the US Economy Today

Time: 9:30am - 10:30am

24

Abstract:

The personal savings rate is identified as an average savings rate for the individual American. The current rate is 5.7%, and that means for every \$100 of after tax income an American brings in, he or she saves 5.7% of it. Since the 1980's Americans have been saving less and less possibly because there more comfortable with their wealth. Looking forward though we try to identify in an environment where the cost of living will be rising, and the interest rates will be rising, will Americans face fiscal troubles if they don't start saving more now? One thing we can understand is that you can't necessarily predict the personal savings rate because you don't know how much one factor will influence another. With increased real wages, increased interest rates, and inflation that has been fairly steady but increasing, it's really a matter of how much one factor offsets the other.



Student: Tara Gire

Student Status: Undergraduate

Major: Communication

Advisor: Dr. Alicia Mason

Title: Time Spent at the Workplace and its Effects on Relationships

Time: 10:30am - 11:30am

25

Abstract:

This interpersonal communication study will focus on relationships, both marriage and dating. This study will aim to seek individual time spent at the workplace and its effects on relationships. Eight subject of all different backgrounds will be interviewed individually and asked several questions regarding their relationship and their workplace. This study aims to find if individuals who spend more time at work and less time together have a healthier relationship than those who spend less time at work and more time together.



Student: Thomas Hext
Student Status: Undergraduate
Major: Economics
Advisor: Dr. Michael Davidsson
Title: An Inquiry into the Causes of Growth in Gross Domestic Product
Time: 10:30am - 11:30am

26

Abstract:

This study is an inquiry into the causes of growth in nationwide gross domestic product in the United States of America. The primary objective has been to measure the effects of taxation, saving rate and government investment on this important economic indicator. "Taxation" has been broken down into three components; personal income tax, corporate income tax and consumption tax. Personal income tax is separated once again into the highest and lowest brackets to facilitate more incisive analysis of the results. Consumption taxes are decided at the state level which meant that an average national consumption tax had to be calculated for every period in study. An ordinary least squares regression, in keeping with econometric studies of this kind, will be the method employed for exploring the relationships of the exogenous variables to the endogenous. This project covers the thirty year stretch between 1977 and 2007, just before the Great Recession. The data for each of the variables have been arranged as indices with the first quarter of 1977 as the base period in all cases. The anticipated outcome, based on the existing research, is that lower levels of taxation and a lower saving rate, will be positively correlated with GDP growth, and that lower levels of government investment will be negatively correlated with GDP growth.



Student: Ming Wie Khoo
Student Status: Undergraduate
Major: Economics
Advisor: Dr. Michael Davidsson
Title: How Does Foreign Direct Investment (FDI) Affect Environmental Pollution
Time: 10:30am - 11:30am

27

Abstract:

The Research paper I am presenting is to find out the effect of FDI towards environmental pollution. Headlines of New York Times on June 15, 2011 found high level of lead concentration in 233 adults and 99 children which could lead to brain, kidney, liver, nerves, stomach damage and could lead to death. The purpose of my study is to validate three hypotheses which is the pollution haven hypothesis, endowments factor hypothesis, and chain effect hypothesis made by Soilita, 2005. The dependent variable would be environmental pollution while the independent variable of the study would be bird, fish, and plant species threatened, Nitrous oxide (N₂O) emissions, carbon dioxide (CO₂-) emissions from liquid fuel consumption, population exposed to levels exceeding World Health Organization (WHO) guideline value of particulate matter (PM) 2.5 air pollution, net foreign direct investment (FDI), FDI inflows, FDI outflows, CO₂ emissions, the ease of doing business and the rate of primary completion. The data was obtained from United Nations Conference on Trade and Development (UNCTAD) and the World Bank. The methods that I will be using is the Ordinary Least Square (OLS) Method on a Linear Regression Model. The result is to capture direct effect of FDI on pollution, ceteris paribus, pooled samples of countries and different country groups to prove/reject the hypothesis above. In conclusion, is to link FDIs and pollution through analysis of the direct and conditional effects of FDI on pollution, environmental and water impacts caused by air pollutants and FDIs from ten groups of countries.



Student: Brett Miller

Student Status: Undergraduate

Major: Finance/Economics

Advisor: Dr. Michael Davidsson

Title: An Analysis of Retail Sales in Micropolitan Areas in the Year 2000

Time: 10:30am - 11:30am

Abstract:

In this paper retail sales will be used to help understand the consumer spending habits of micropolitan areas in the year 2000. The year 2000 was a big year for American consumers, it was at the turn of the century, some said that the world was ending; others said it was just the beginning of a new technological era. This paper will take a look at many factors that could have affected the retail sales (i.e. consumer spending) in micropolitan areas, as well as be able to help explain the consumer confidence in the year 2000. Areas such as population growth, wages, sales tax, and poverty among many other things will help explain their effects on consumer spending. This paper will first take a look at what is consumer spending and consumer confidence, and then lead into a statistical model with multiple tests in order to analyze the numbers behind consumer spending in this year. Ordinary least squares regression will be used to help explain statistically what effected retail sales in the year 2000. The data used is from the US Census Bureau, and includes 554 micropolitan areas in the lower 48 states of America. Most studies previously conducted only analyze America as a whole of Metropolitan areas, this study is significant in finding effects on retail sales in micropolitan areas only. This study was rather inconclusive to the existing data. The model found that only sales tax and national amenity scale were significant to the study. In this paper we find that micropolitan areas have a hard time being measured based off retail sales alone. I would recommend further studies be conducted, however some findings in this model do exist.



Student: Nicolas Robinson

Student Status: Undergraduate

Major: Economics and Marketing

Advisor: Dr. Michael Davidsson

Title: Which Affects GDP More: Exchange Rates or FDI

Time: 11:30am - 12:30am

Abstract:

Which affects GDP First, Exchange Rates or FDI? Many people have argued which comes first, FDI or Exchange rates. This is very important to countries because it could allow them to know which is more likely to affect their GDP first and possibly take counter measures to make sure these affects are managed properly.



Student: Kelsey Tallent
Student Status: Undergraduate
Major: Finance/Economics
Advisor: Dr. Michael Davidsson
Title: Gambling on Revenue
Time: 11:30am - 12:30am

Abstract:

My findings from my study have concluded that median age and subprime credit population were actually significant for every test when I thought they would be the least significant. If the evidence suggested is true Sedgwick county has a population that is focused on the younger population with higher credit scores when income is insignificant so this tells us that the college aged people with parents that have high credit scores are fueling casino revenue. Wyandotte county can be seen as the exact opposite because it is focused on the older population with higher income and higher credit scores. Ford County can be seen as focused on the lower income bracket because of higher poverty rates and lower credit scores. We can make conclusions about Crawford county Kansas Crossing Casino will continue to be successful and if we were able to run a test the results would suggest that all variables except unemployment will have positive relationships.



Student: Skyler Worley
Student Status: Undergraduate
Group Members: Erykah McClendon and Avery Mielke
Major: Psychology
Advisor: Dr. Ryan Speelman
Title: Blackjack Player Choice, Superstition, and Calculated Odds of Winning
Time: 11:30am - 12:30am

Abstract:

Given the prevalence of gambling and preponderance of gaming options, efforts to curb problem gambling and promote responsible play for recreational players are of value. The current experiment analyzed choice behavior in the context of blackjack, the associated odds produced by these choices, and the influence of accurate rules (instructions) regarding gameplay. Results found novice players deviate significantly from optimal strategy and adjusted payout rates change as a function of this deviation. For these players, the predicted losses incurred following such strategies deviated significantly from the anticipated outcomes predicted by the odds that are commonly advertised. Next, participants viewed a video that addressed common misconceptions about gambling e.g., "It is good advice to stay in the same seat when I am winning," the chance nature of gambling, as well as strategy and choice behavior that does influence the odds. Following instruction, self-reported measures of superstition and illusion of control decreased while player choice and odds of winning improved. Simply educating individuals on strategy and expected outcomes may improve gameplay as well as reduce the role of superstition, inaccurate rules, and contextual variables that contribute to problem or pathological gambling.



Student: Katelyn Roth
Student Status: Graduate
Major: Creative Writing
Advisor: Mrs. Laura Lee Washburn
Title: Bodyborders
Time: 11:30am - 12:30pm

32

Abstract:

Bodyborders is a work of poetry which seeks to serve a role in recovering the self. It acts as an exposé in exploring the effects of a patriarchal society on the experiences and maturation of the only daughter in a traditionally religious household. Both socially critical and deeply personal, the poems that make up this collection are at once contemplative, honest, and analytical. Whether recalling and responding to injustices witnessed as she was coming of age or considering the ways these injustices might continue to affect her in adulthood, the writer stands not to ruminate on her pain, but to expel it from the body in such a way that the process constitutes both healing and art.

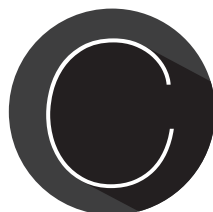


Student: Mark Weaver
Student Status: Graduate
Major: English
Advisor: Mrs. Lori Martin
Title: Kablaka: Creating a Language
Time: 11:30am - 12:30pm

33

Abstract:

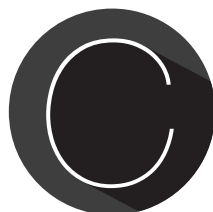
As I have learned from my courses in Linguistics, language is a key component of human communication. In order to explore the intricacies of language and develop a better understanding of how language in general is structured, I have created an original language called Kablaka that encompasses the essential aspects of language including phonology, morphology, syntax, and semantics. This language was inspired by several others, incorporating phonological elements of Norse, morphological elements of Japanese and Mandarin, and syntactic elements of Japanese and Spanish. As language in general is reflective of culture and perspective, so does Kablaka reflect the culture and values of the Kejaka, the fictional primitive people who speak this language. These values include simplicity, efficiency, and rational bases for making decisions. This presentation will explain the basic mechanics of Kablaka and the Kejakan values it represents, and demonstrate how, by understanding how different languages function, one can better understand and appreciate the differences between cultures, and develop a greater receptivity toward people of different backgrounds.



Student: Kayla McCollough
Student Status: Undergraduate
Major: English
Advisor: Mrs. Lori Martin
Title: The Nature of Poetry
Time: 11:30am - 12:30pm

Abstract:

I will be reading a collection of four poems that I have been working on this semester in Chris Anderson's Advanced Poetry Writing class. These are lyrical poems that explore themes such as how the idea of nature and its creatures has changed over time. They also touch on parts of nature that aren't so beautiful to some people. These poems were inspired by readings from Chris Anderson's Environmental Literature class such as poems by Maxine Kumin and selections from works by Henry David Thoreau. My purpose for writing these poems was to connect readers to parts of nature that are sometimes overlooked or forgotten. By using descriptive language, imagery, and sound techniques, I strived to reach people's emotions and help them develop a new view of nature. I worked on these poems throughout the semester, one to two months each, and related readings and coursework from my Environmental Literature class to my poetry writing class. I read essays and poems by naturalist writers such as George Catlin, Henry David Thoreau, Emily Dickinson, Walt Whitman, and Maxine Kumin. Writing these poems has helped me see nature in a different light. These poems have helped me improve my use of imagery and sound to connect with my reader and make the meaning of the poem more impactful. As I was writing and revising these poems it inspired me to keep writing about other parts of nature that need to be explored and shown to the world.



Poster Presentations

Category



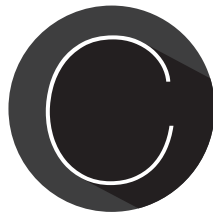
Sciences and
Technology

Category



Business,
Education and
Humanities

Category



Creative Works

Category



Topical Literature
Review

Category



High School

Student: Nawaf Albeladi

Student Status: Graduate

Major: Chemistry

Advisor: Dr. Ram Gupta

Title: A Facile Method to Synthesize Bi-Functional Nanostructured Nickel Compounds for Energy Storage and Water Splitting Applications

35

Abstract:

In recent years, the increasing demands for clean, efficient, and renewable energy have triggered the researchers to increase their effort to develop multi-functional materials for energy applications. Supercapacitors, among the comparative energy storage devices, have attracted considerable attention due to their high energy storage capacity, fast charge-discharge capability, long cycle life, and high power density. Transition metal oxides and sulfides are being used as materials for supercapacitor applications due to their excellent conductivity, high electrochemical properties and large theoretical energy storage capacitance. In this regard, we have used as a facile hydrothermal method to synthesize nanostructured NiO, NiOH, and NiS in presence of cetyltrimethylammonium bromide (CTAB) and polyvinylpyrrolidone (PVP) on nickel foams using a binder-free approach. These synthesized nanostructured materials were used for both supercapacitor applications and catalyst for water splitting. The electrochemical performance of the synthesized nanostructured materials revealed that their properties depend on the presence of CTAB and PVP during synthesis. The areal capacitance was observed to be 67, 859, 2633 mFcm⁻² for NiO, NiOH, and NiS_x, respectively. On the other hand, the electrocatalytic performances for oxygen evolution reaction (OER) and hydrogen evolution reaction (HER) were investigated. The NiOH-CTAB electrode showed the lowest OER overpotential of 303 mV at 10 mA/cm² and a Tafel slope of 48 mVdec⁻¹. The lowest overpotential of 177 mV at 10 mA/cm² and a Tafel slope of 109 mVdec⁻¹ were observed for NiOH-PVP electrode for HER. Our results suggest that nickel based nanostructured materials could be used as bi-functional materials for energy storage and generation.



Student: Ghazwan Alshammari

Student Status: Graduate

Major: Physics

Advisor: Dr. Serif Uran

Title: P- $\text{AlSbGe}/n\text{-Si}$ (100) Photovoltaic Cells Produced by Thermal Evaporation

36

Abstract:

Formation of new p-type semiconducting materials may provide an alternative to the traditional photovoltaic cells because of their non-toxic, and chemically stable characteristics for harvesting solar energy. We present our results on an Aluminum Antimonide doped with Ge (Al 82 wt%, Sb 12%, Ge 4%), p- AlSbGe , forming a photovoltaic cell on the n-type Silicon substrate, using aluminum as a back contact. The sample is produced via thermal evaporation in a vacuum. The n-type 1.58 eV indirect band gap and 2.22 eV direct band gap. P- AlSbCu serves as a light absorber and forms a p-n junction on top of $\text{SiO}_2/n\text{-Si}$ substrate, which creates electron-hole pairs. The cell mainly absorbs sunlight in the visible and near-infrared region of the electromagnetic spectrum (560 nm and 775 nm). A short-circuit voltage of 0.122V was measured before annealing and 0.145 V after annealing at 400 OC degrees.



Student: Mohammed Alshammari

Student Status: Graduate

Major: Physics

Advisor: Dr. Serif Uran

Title: n- AlSbCu /p-Si(111) Photovoltaic Cells Produced by Thermal Evaporation

37

Abstract:

Formation of new n-type semiconducting materials may provide alternative to the traditional photovoltaic cells because of their non-toxic, and chemically stable characteristics for harvesting solar energy. We present our results on an Aluminum Antimonide doped with Cu (Al 82 wt%, Sb 12%, Cu 4%), n- AlSbCu , forming an n-type photovoltaic cell on a p-type Silicon substrate, using aluminum as a back contact. The sample is produced via thermal evaporation in vacuum. The n-type 1.58 eV indirect band gap and 2.22 eV direct band gap n- AlSbCu serves as a light absorber and forms a p-n junction on top of SiO_2 /p-Si substrate, which creates electron-hole pairs. The cell mainly absorbs sunlight in the visible and near infrared region of electromagnetic spectrum (560 nm and 775 nm). A short circuit voltage of 0.032 V was measured before annealing and 0.178 V after annealing at 400 °C. The five times improvement in the short circuit voltage is rather surprising since Cu conversion to CuO would provide more p-type characteristics to the film.



Student: May Altammar

Student Status: Graduate

Major: Chemistry

Advisor: Dr. Ram Gupta

Title: High Performance and Durable Cobalt Sulfide for Energy Storage Applications

38

Abstract:

Local energy storage is one of the important need for growing mobile technology. Supercapacitors and batteries are widely used local energy storage devices. Supercapacitors are used due to their high power density, charging cycle and durability. Current supercapacitor devices suffer from poor energy storage density and stability. Hence, this study focuses on nanostructured materials for supercapacitors. In this research, we have synthesized nanostructured cobalt hydroxide, cobalt oxide and cobalt sulfide using a facial hydrothermal method. Structural characterization was performed using X-ray diffraction to ensure the phase purity of the synthesized materials. The electrochemical measurements (Cyclic Voltammetry and Galvanostatic charge-discharge) were performed to illustrate the charge storage capacity of the synthesized materials. It was observed that cobalt sulfide displayed the highest specific capacitance of 2700 mF/cm^2 at 3 mA/cm^2 , while cobalt oxide and cobalt hydroxide showed 108 and 349 mF/cm^2 at 3 mA/cm^2 , respectively. Long-term stability performance up to 5,000 cycles of the charge-discharge study showed almost 100% charge retention. Our results suggest that cobalt sulfide could be a promising material for high performance and durable supercapacitor devices.



Student: Sanket Bhoyate

Student Status: Graduate

Group Members: J. Chen, M. Ionescu, P. K. Kahol, S. R. Mishra, and D. Radojic,

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: Novel Reactive Polyols for Bio-based Rigid Polyurethane Foams

39

Abstract:

Poor flame retardancy of polyurethanes (PU) is a global issue as it limits their applications particularly in construction, automobile, and household appliance industries. The global challenge of high flammability of PU can be addressed by incorporating flame-retardant materials. However, additive flame-retardants are non-compatible and depreciate the properties of PU. Hence, reactive flame-retardants (RFR) based on aliphatic (Ali-1 and Ali-2) and aromatic (Ar-1 and Ar-2) structured bromine compounds were synthesized and used to prepare bio-based PU using limonene dimercaptan. The aromatic bromine containing foams showed higher close cell content (average 97 and 100%) and compressive strength (230 and 325 kPa) to that of aliphatic bromine containing foams. Similar behavior was observed for a horizontal burning test where with a low concentration of bromine (5 wt %) in the foams for Ar-1 and Ar-2 displayed a burning time of 12.5 and 11.8 s while, Ali-1 and Ali-2 displayed burning time of 25.7 and 37 s, respectively. Neat foam showed a burning time of 74 s. The percentage weight loss for neat PU foam was 26.5%, while foams containing 5 wt % bromine in Ali-1, Ali-2, Ar-1, and Ar-2 foams displayed weight loss of 11.3, 14, 7.9, and 14%, respectively. Our results suggest that flame retardant PU foams could be prepared effectively by using RFR materials.



Student: Kimberly Byler

Student Status: Graduate

Major: Nursing

Advisor: Dr. Mandi Alonzo

Title: Progressive Muscle Relaxation and Simulation Anxiety in Nursing Education

40

Abstract:

The purpose of this proposed research project will be to test the ability of pre simulation progressive muscle relaxation to decrease the level of anxiety experienced by nursing students during simulation exercises. Simulation is an important teaching strategy in nursing education; it provides an arena in which to practice skills and decision-making without putting real patients in danger of any mistakes. Student anxiety is a challenge of the simulation teaching strategy, because it can make students feel unsuccessful. Decreasing student anxiety will be important as simulation is used more frequently in nursing education. The proposed study will assess students' perceptions of anxiety during simulations and the perceived effect of pre-simulation progressive muscle relaxation on student anxiety and outcomes.



Student: James Daniel
Student Status: Graduate
Major: Biology
Advisor: Dr. Dixie Smith

41

Title: The Effects of Clipping on the Biomass Production of Native Warm Season Grasses on Reclaimed Abandoned Coal Mine Soils

Abstract:

Strip mining leaves behind highly disrupted plant and soil communities. Mined land reclamation returns the land and habitat to something similar to the original systems, however, reclamation cannot completely restore the soils to their original state. Subsequently, normal frequencies of management practices may not be as effective as in undisturbed soils. Understanding how the severity of soil disturbance affects plant production is important for habitat rehabilitation, but also is determining effective management techniques to be implemented following reclamation. This project addresses the questions of whether biomass production in warm season grasses on reclaimed coal mines is promoted or inhibited by clipping, and how clipping frequency affects productivity. Grasses were clipped to simulate mowing and grazing at three reclaimed mine sites and three undisturbed control sites. Each site had ten randomly placed sample points with three sub-points each labeled A, B, and C at which samples were clipped three, two, and one times respectively. A total of 330 samples were collected and processed. Preliminary analysis shows a distinct effect of clipping on the A and B samples. When compared to the C clippings which were allowed to grow for the full season, the A and B samples demonstrated a sharp decrease in biomass production after clipping. Statistical significance has not been calculated yet to draw final conclusions. Preliminary results appear to support the hypothesis in that clipping decreases biomass production, however, this data suggests that whether soils are disturbed or not, cutting earlier than peak production decreases the overall biomass produced.



Student: Saloni Darji
Student Status: Graduate
Major: Polymer Chemistry
Advisor: Dr. Santimukul Santra

42

Title: Curbing Cancer via Peptide and Neem (*Azadirachta indica*) Extract

Abstract:

Triple negative breast cancer (TNBC) is known to be the most aggressive type of breast cancer. Almost 15-20% of women in the US suffer from TNBC. Like in women where breast cancer is more widespread, men in their later ages have higher risks of prostate cancer. Almost 3 million men suffer from prostate cancer every year in the US. All cancer cells overexpress folate receptors. The treatment for these types of cancers (hormonal therapy, chemotherapy and radiation therapy) are abortive and have many side effects. Here, we aim to develop a targeted drug delivery system using functionalized iron oxide nanoparticles, which help in curtailing the side effects and combating cancer. For MDA-MB-231 (TNBC cells), we are conjugating the surface of our nanoparticles with ICAM1 antibodies, which are specific to this cell. Similarly, for LNCaP (prostate cancer cells), we are conjugating the nanoparticles with glutamate. CT20p and Gedunin were encapsulated into this nanoparticle. CT20p is a peptide known to form pores in mitochondria and disrupting its cycle, whereas Gedunin, an extract of neem plant, is a hsp90 inhibitor. Various cell based assays such as ROS, Apoptosis & Necrosis, MTT and Migration assay were performed to test the efficiency of our drug delivery system. We concluded our drug delivery system is very potent in targeting the cancer cells and hampering its machineries leading to cell death.



Student: Ashleigh Elbert
Student Status: Graduate
Major: Biology
Advisor: Dr. Virginia Rider

43

Title: Expression of Ligand CCL19 in Dawley Rat Uterine Tissue and the Possible Action to Prepare for Implantation and Placentation in the Uterus

Abstract:

Autoimmune disorders including those that impact embryo implantation and placentation can be life altering to those affected. Current research exploring how T-regulatory cells and recruitment occur are quite common, especially in the realm of HIV and cancer research among other autoimmune conditions that impact human health. Despite this knowledge, little research has been done in regards to how these T-regulatory cells, specifically their ligands and receptors, act on the uterus during the process of embryo implantation/placentation. More specifically my project will build on the research of Dr. Virginia Rider. I will be exploring Chemokine CCL19 and the uterine tissue expression of this ligand in ovariectomized (OVX) Dawley rat uterine tissue as well as ovariectomized Dawley rats that have undergone specific treatment with progesterone (2 mg) for three consecutive days (OhE) and some progesterone treated Dawley rats which were given a single shot of estradiol (0.2µg) and the uterine horns removed six hours later (6hE). In order to achieve this I will be exploring and building an understanding of hormonal regulation of uterine chemokines. I aim to discover whether the uterus produces or increases production of these ligands in response to the abovementioned hormone treatments or if the ligand is recruited once implantation has occurred. I will be completing an immunohistochemistry protocol in which T-cell expression will be examined in paraffinized uterine tissue from Dawley rats that have been exposed to each of the treatments (OVX, OhE, and 6hE) mentioned above and examining for CCL19 antibody presence.



Student: Lucy Lotspeich
Student Status: Graduate
Major: Graphics Management
Advisor: Dr. Tatiana Goris

44

Title: Investigations of Factors that Affect Asthma Symptoms of College Students in Areas near Coalmines with a Possible Solution

Abstract:

Many Americans are diagnosed with asthma and allergies every year. Different environments play a role on people's asthma and allergy symptoms. This study will be a case study of 30 college students at Pittsburg State University with asthma and allergies. The purpose of this study is to determine if symptoms are worse in areas with coalmines compared to other areas. A possible solution to bad air is a product called Air Ink. Air Ink takes the pollution out of the air and uses it to create ink for markers, paint, and pens.



Student: Kevin McNay

Student Status: Graduate

Group Members: James Beach, Petar Dvornic, Jamie Messman, and Dragana Radojic

Major: Polymer Chemistry

Advisor: Dr. Jeanne Norton

Title: Effects of Crosslinkers and Catalysts on Rheology and Shelf Stability of Silica-Filled Model Polysiloxanes

45

Abstract:

Polysiloxanes are a class of high performance polymeric materials that are used in a wide variety of applications, including O-rings, gaskets, sealants, coatings, and adhesives. However, their elastomers, which can be obtained by crosslinking linear precursors using various crosslinkers, generally exhibit low strength and have poor mechanical properties unless reinforced. Therefore, fillers, additives, UV-stabilizers, and anti-oxidants are often incorporated in order to improve the resulting properties. The process of compounding incorporates additives into polysiloxane formulations, with one approach being twin-screw extrusion which vigorously mixes the additives into the polymer matrix. In this study, a lab-scale co-rotating twin-screw extruder was used to compound a commercially available reinforcing silica filler, Hi-Sil-233D, and a commercial polysiloxane, vinyl-terminated diphenyl-dimethyl siloxane copolymer (Gelest PDV-0535), with two crosslinkers: HMS-082 and HMS-151. The crosslinking reactions were initiated with two separate catalysts, platinum acetylacetonate in 1,3-dioxolane ($\text{Pt}(\text{acac})_2$) and trimethyl (methylcyclopentadienyl) platinum IV in 1,3-dioxolane ($((\text{MeCp})\text{Pt}(\text{Me})_3)$). In addition, diethyl azodicarboxylate (DEAD) in dry toluene was used as an inhibitor. Thermogravimetric analysis (TGA) was used to determine the consistency of the additive content; oscillatory rheometry was used to determine yield stress; and flow rheology was used to evaluate the thixotropy of the compounded samples. Rheometric analysis also helped determine the shelf-life of the polysiloxane system before becoming fully crosslinked.



Student: Kaustubh Mhatre

Student Status: Graduate

Major: Engineering Technology

Advisor: Dr. Eli Aba

Title: HVAC- Energy Auditing

46

Abstract:

During previous years, the energy consumption of the chiller plant in the HVAC (Heating Ventilation and Air Conditioning) system had been a main problem. Our goal was to reduce the energy consumption in the chiller plant of the HVAC system. We worked on areas like insulation of evaporator and piping, the set point of the chiller, the control valve and choking of the evaporator and condenser tubes. The six sigma method was used, and the project was framed into DMAIC (Define, Measure, Analyze, Improve, and Control) tool. We found out that we were able to save an average electrical consumption of about 4.86% than the previous year which caused savings to their accounts. Installation on the control valve proved great in reducing the chiller load thereby saving in the average electrical consumption. Also, the installation of the chiller insulation as per the need of the condition proved to be more precise in the necessary way. We also suggested that the environment near the AHU (Air Handling Units) should be clear to maintain the airflow properly throughout the AHU. The Chiller set point must be monitored and changed according to the ambient conditions in order to reduce the chiller load, and therefore, reduce the average electrical consumption. The process of descaling of the chiller should be done quite frequently or when they realize the change in the chiller load. The frequent descaling process rather than fixed interval of cleaning practice reduces the average electrical consumption.



Student: Camila Muliterno Zequine

Student Status: Graduate

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: Cost Effective Ways to Fabricate Multifunctional Nanostructured Materials for Energy Applications

47

Abstract:

Efficient and economical water splitting is one of the main important energy sources due to renewability and cleanliness. Synthesis of efficient electrocatalysts for both hydrogen evolution reaction (HER) and the oxygen evolution reaction (OER) is desired for a good water splitting system and operations with reduced expenses. Recently, rare earth or precious metal-based catalysts such as RuO₂, IrO₂ and Pt are used for water electrolysis, however, the high cost and lack of abundance, unfortunately, limit their applications. In this work nickel cobalt sulfide and nickel cobalt hydroxide were used as an efficient electrocatalyst for overall water splitting. Nickel cobalt sulfide required an overpotential of 293 mV to achieve a current density of 10 mA/cm² for oxygen evolution reaction (OER). Nickel cobalt hydroxide required an overpotential of 150 mV to achieve a current density of 10 mA/cm² for hydrogen evolution reaction (HER). The stability of the electrocatalyst for overall water splitting was tested using chronoamperometry. The samples show a long-term stability for more than 20 h in both acidic and alkaline aqueous solutions. A facile solvothermal method and electrochemical stability of nickel cobalt sulfide and hydroxide provide current development and future commercial applications in water splitting.



Student: Elena Olson

Student Status: Graduate

Major: Biology

Advisor: Dr. Anuradha Ghosh

Title: Application of Whole Genome Sequencing and Food Safety and Food Quality Control

48

Abstract:

Whole genome sequencing (WGS) or next-generation sequencing is an evolving technology that can distinguish between different bacterial strains and even slight variations by geography within the same strain with utmost precision. The Food and Drug Administration (FDA) is currently employing WGS investigating food-borne pathogen related outbreaks, and foresees to use WGS to routinely analyze samples from food companies in compliance with the Food Safety Modernization Act (FMSA) and other regulations. Since there is an upsurge of food products containing ingredients imported from different countries, source tracking of contaminants/pathogens has become increasingly challenging. This literature review aims to provide insight on how genomic information of pathogens could be complemented with geographic information systems and could facilitate the understanding of genome evolution. Also, few notable cases of recent outbreaks where WGS has been applied for investigation will be discussed. With increasing reliance on WGS and its affordability, the objective of this present study has been framed. Various local food companies will be contacted and bacterial isolates will be obtained from the food samples. Samples may represent food-related outbreaks as well as routine quality control measures. Total genomic DNA will be extracted from individual pure isolates and the 16S rRNA gene will be PCR amplified to confirm their eubacterial origin. WGS will be carried out using an illumina platform whereas Bash and UNIX based command lines will be used as tools for genome assembly and annotation. This project will develop the skills of a bioinformatician with knowledge of food microbiology as well as develop an understanding of comparative genomics and evolution. The focus of this study will not be limited to the identification of contaminants in food ingredients or the environment of the food-processing facility, but also mine the data for serotyping, virulence, or antibiotic resistance traits.



Student: Sneha Ramanujam
Student Status: Graduate
Major: Polymer Chemistry
Advisor: Dr. Santimukul Santra
Title: Magnetic Nanosensors for the Detection of Zika Virus

49

Abstract:

One of the most vital mechanisms for the propagation of ZIKA virus (ZIKV) is the binding and entry stage. While there is still much to be determined about this key stage, it has been demonstrated that the initial interactions between ZIKV and receptors expressed in various host cell populations is a critical determinant of ZIKV tropism. Herein, we have introduced a novel application of magnetic relaxation technology that allows for the rapid and sensitive analysis of simple host-pathogen interactions. We have verified that ZENV is able to bind with both HSP70 and TIM-1 in addition to AXL. The computational analysis of molecular docking between ZENV and AXL established their possible binding sites and calculated binding energy for the first time. Additionally, we have explored the possibility of using AXL-antibodies or crizotinib as entry inhibitors. Our findings suggest that while the extracellular domain of AXL has the highest affinity for ZENV; HSP70, TIM-1, and phosphatidylserine might also play active roles in ZIKA tropism, which offers a potential explanation for the variety of ZIKA-associated symptoms. Our magnetic relaxation platform allows for timely and sensitive analysis of these intricate binding relationships, and it is easily customizable for further examination of additional host-pathogen interactions.



Student: Tanuja Tummala
Student Status: Graduate
Group Members: Momin Ansare, Tuhina Banerjee, Saloni Darji, and Kalee Woody
Major: Polymer Chemistry
Advisor: Dr. Santimukul Santra
Title: Olaparib and Doxorubicin Carrying Translational Nanotheranostics for the Treatment of Prostate Carcinomas

50

Abstract:

The imaging, diagnosis and successful treatment of prostate cancer continues to be a challenging problem and it is estimated that 1 out of 6 men will be diagnosed with the disease during their lifetime, making this disease the second leading cause of death among men. Therefore, developing more effective therapeutic agents against advanced prostate cancer that allow for simultaneous therapy and monitoring of tumor growth are equally important. Particularly, theranostic agents are targeted to the disease regimes that allow delivery of therapeutic agents in high concentrations to prostate cancer, while monitoring drug localization to the tumor. In this presentation, we will discuss a new method of targeting prostate cancer. We are reporting for the first time the use of glutamate ligand-decorated magnetic drug delivery system to target PSMA overexpressing prostate cancer cells. Furthermore, this presentation will also highlight the synergistic anticancer activity of olaparib and doxorubicin for the targeted treatment of PSMA-positive LNCaP cells. Cell-based assays such as Cytotoxicity assay, cell uptake studies, Migration assay, Comet assay, ROS, Apoptosis and Necrosis were performed. Results showed more than 80% LNCaP cells were dead after 48 h incubation of the drug-carrying nanoparticles. These results were further confirmed using optical microscopy and magnetic resonance imaging technologies.



Student: Samantha Young Pryer

Student Status: Graduate

Major: Biology

Advisor: Dr. Neil Snow

Title: Floristic Survey of Crawford and Cherokee Counties Kansas: A Report of Known Taxa, Including 49 State Records

51

Abstract:

Plant distributions change in the Midwest as surely as anywhere else, and newly arrived non-native taxa continue to be found regionally. Crawford and Cherokee counties in extreme southeast Kansas contain over half of the known vascular plant biodiversity of Kansas, which comprises ca. 2300 species (following the nomenclature of Biota of North America by Kartesz). Each county had seen only limited collecting since the extensive work by H.A. Stephens, and a comprehensive floristic survey never had been done for Cherokee County. Only one county-wide survey existed previously for Crawford County, by E.S. Gibson at Pittsburg State University in 1963. The overarching objective was to document comprehensively the native and non-native flora of southeast Kansas. Fieldwork occurred mostly in 2014 and 2015. Based on 6400+ newly collected specimens and other vouchered specimens, 1455 taxa are reported, including 279 county records and (tentatively) 49 state records, many more than were expected. The state records comprise taxa in 25 families and 41 genera including: *Allium*, *Liquidambar*, *Leucojum*, *Narcissus*, *Apocynum*, *Ilex*, *Hedera*, *Euthamia*, *Antennaria*, *Solidago*, *Fleischmania*, *Woodwardia*, *Myosotis*, *Cardamine*, *Arenaria*, *Stellaria*, *Cerastium*, *Carex*, *Scirpus*, *Desmodium*, *Lespedeza*, *Quercus*, *Castanea*, *Hypericum*, *Juncus*, *Salvia*, *Callicarpa*, *Pinus*, *Bromus*, *Dichanthelium*, *Elymus*, *Eragrostis*, *Microstegium*, *Sorghum*, *Setaria*, *Ficaria*, *Rhamnus*, *Crataegus*, *Populus*, *Solanum*, and *Viola*.



Student: Chunyang Zhang

Student Status: Graduate

Group Member: Dr. Pawan Kahol

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: Cobalt Sulfide Nanowires as an Efficient and Stable Bifunctional Electrocatalysts for Overall Water Splitting

52

Abstract:

Earth-abundant, highly active and low-cost bifunctional electrocatalysts which could operate at low overpotential are of significant importance to the industrial application of water splitting. In this research, we used a facile method to synthesize cobalt sulfide nanowires on nickel foam as an efficient electrocatalyst for overall water splitting. Cobalt sulfide nanowires displayed high electrocatalytic activities in both hydrogen evolution reaction (HER) and oxygen evolution reaction (OER), having an overpotential of 299 and 217 mV to achieve a current density of 10 mA/cm² for OER and HER, respectively. The electrodes showed remarkable stability after 2000 cycles (13 mV difference in overpotential at 10 mA/cm²) and on bending (almost identical curves before and after bending). Furthermore, nanowires of cobalt sulfide applied as both anode and cathode required a low cell voltage of 1.66 V to achieve a current density of 10 mA/cm² in overall water splitting. The superior electrocatalytic activities of the cobalt sulfide nanowires could be due to favorable electron transfer, high surface area and porosity which allow easy escape of the generated oxygen and hydrogen. Thus, cobalt sulfide with outstanding bifunctionality and electrochemical stability could be a promising material for commercial applications in water electrolysis.



Student: Chen Zhao

Student Status: Graduate

Group Member: Dr. Pawn Kahol, K. Siam, C. Zhang

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: A Hybrid Electrode of Cobalt Oxide@Polypyrrole Nanostructure for High-Performance Supercapacitor and Oxygen Evolution Reaction

53

Abstract:

With rapidly growing demand for portable electronics and cleanest renewable energy sources, high-performance electrochemical energy storage and conversion devices are exceedingly desired. Supercapacitors have stimulated widespread research interest due to their high-power density, fast charge-discharge rate, safe operation and good long lifespan compared with batteries. In addition, water splitting is the greenest way which could use low-cost, highly effective and environmental-friendly material to generate hydrogen as a fuel and oxygen as a breathable gas. In this work, a hybrid electrode of polypyrrole-coated cobalt oxide nanomaterials was prepared through a solvothermal and electrodeposition process where cobalt oxide and polypyrrole was used as a core and a shell, respectively. The core/shell structured electrode displayed high electrocatalytic activities in both supercapacitor and oxygen evolution reaction. The observed result showed that Co₃O₄@PPy electrode exhibited a large areal capacitance of 7295 mF/cm² at the scan rate of 1 mV/s. The outstanding electrocatalytic activities of Co₃O₄@PPy required a very low overpotential of 266 mV to achieve a current density of 10 mA/cm² with a Tafel slope of 57mV/dec for OER. Moreover, Co₃O₄@PPy electrode displayed a considerable durable electrocatalytic performance up to 15 hours of testing with an extremely small difference (3 mV at 10 mA/cm²) in overpotential after 15 hours of measurement. The Co₃O₄@PPy hybrid composites could be a promising electrode material for next-generation energy storage and conversion devices.



Student: Chen Zhao

Student Status: Graduate

Group Member: Dr. Pawn Kahol, K. Siam, C. Zhang

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: Highly Efficient and Durable Electrocatalyst of Fe-Ni Sulfides for Overall Water Splitting

54

Abstract:

The global energy crisis and environmental pollution derived from traditional fossil fuels have promoted considerable efforts to develop clean and sustainable energy resources. Electrochemical water splitting has been vigorously pursued to produce hydrogen as a promising fuel due to the abundant H₂O resource and zero carbon emission. However, this process happens at an extra potential which called overpotential without an efficient electrocatalyst. In this work, we have synthesized FeNiS electrode using a facile method for overall water splitting. The FeNiS electrode required an overpotential of 246 and 208 mV to achieve a current density of 10 mA/cm² with a Tafel slope of 49 and 109 mV/dec for oxygen evolution and hydrogen evolution reactions, respectively. As a bi-functional catalyst, FeNiS electrode required a low cell voltage of 1.57 V to produce a current density of 10 mA/cm². Furthermore, the FeNiS electrode showed a very durable electrocatalytic performance up to 2,000 cycles and remarkable flexibility without any detrimental influence at different specific bending degrees. This outstanding catalytic performance makes FeNiS material a promising material for its applications in the overall water splitting.



Student: Wesley Brantley

Student Status: Undergraduate

Group Members: Tuhina Banerjee, Ren Bean, and Tanuja Tummala

Major: Biology

Advisor: Dr. Santimukul Santra

Title: Magnetic Nanosensor Platform for the Fast and Accurate Detection of Bacterial Contaminants in Platelet Concentrates

Abstract:

In transfusion medicine, contamination of blood products continues to pose a serious challenge. Importantly, blood platelet concentrates are known to be frequently contaminated with bacteria due to the storage conditions and often leads to a fatal condition sepsis. The CDC estimates 250,000 Americans die every year from sepsis. Current diagnostic assays for the detection of bacteria in transfused platelets mostly rely on culture based techniques and are often laborious and time consuming. In recent years, nanotechnology has been extensively used for the detection of bacterial targets while offering greater sensitivity and faster detection kinetics. This presentation will primarily focus on magnetic relaxation techniques for the fast and sensitive detection of bacteria in platelet concentrates and whole blood using magneto-fluorescent nanosensors. The magnetic relaxation property of our nanosensors enabled low CFU counts detection in whole blood and platelet concentrates. Unique pairing of magnetic relaxation with fluorescence will allow us to discriminate between two potentially contaminating bacteria in platelet concentrates: *Staphylococcus epidermis* and *E. coli*. Additionally our results demonstrate the potential application of magneto-fluorescent nanosensors for the quantitative assessment of fast and slow growth kinetics of bacteria.



Student: Brandy Brouhard

Student Status: Undergraduate

Group Members: Rachael Ashcraft, Haley Carothers, Molly Crager, John Fredrickson, Olivia Houston, Sarah Lueck, Paula Ovelar Oviedo, Katrina Poulsen, Lucas Roecker, and Jessica Wright

Major: Psychology

Advisor: Dr. Bruce Warner

Title: Does the Distribution of Attention in the Visual Field Conform to a Mexican-Hat Distribution?

Abstract:

Does the Distribution of Attention in the Visual Field Conform to a Mexican-Hat Distribution? Whether the distribution of attention in the visual field declines from the focal point as monotonically decreasing gradient or as Mexican-hat-like distribution is still an open question, with some evidences supporting the former and other evidences supporting the latter. We present two experiments that address this question. In the first experiment, high perceptual load was contrasted with low perceptual load, and target-flanker distances were set at 1.2, 2.3, 3.3, 4.3, and 5.1 degrees of visual angle. In the second experiment, only low perceptual load was examined and target-flanker distances were more than doubled. In the low perceptual load condition of the first experiment, a strong quadratic trend was observed in the incompatible flanker RTs, yielding a large flanker effect for the smallest target-flanker separation, smaller effects at intermediate separations, and a recovery of flanker effects at the widest separation. With the high-load, a linear trend was observed, with flanker interference declining across distance from the target. The result of the low-load condition is compatible with accounts of a suppressive annulus around the focus of attention. In the second experiment, a significant quadratic decline was found over distance, but there was no observable rise of flanker effects at the largest target-flanker separations. Analysis of individual data sets revealed that, although the attentional fields of many individuals appeared to follow a Mexican-hat-like profile, many did not, in contrast with assertions by Caparos and Linnell (2009) that aggregated profiles are the combined result of individual Mexican hat distributions.



Student: Harley Burch

Student Status: Undergraduate

Group Member: Seth Scott

Major: Electronic Engineering Technology

Advisor: Mr. Randy Winzer

Title: Wolf's Eye, Peripheral Car Detector for Semi-Trailers

Abstract:

The Wolf's Eye[©] is a sensory device system that is easier to install, easier to use and more reliable in adverse conditions than the current driving peripheral technology. It will attach to a semi-truck using a magnet and the electronics will be protected by a barrier. The system will detect obstructions with sensors mounted in the pucks. These pucks will pick up the obstructions in most of the worst conditions. From here, the rear sensor will be equipped with a low-detail camera and the sensors. The camera feed will be displayed in a monitor screen in the car. It will have a series of signals on this screen to indicate obstructions and where they're located. Preferably, the system must detect if there are any obstructions even at lower angles. The system must also have lower power demands, so that they can work for long periods of time. The Wolf's Eye[©] controller will use wired communications to communicate with the display panel. It will have to communicate wirelessly to each puck to make it easy to install. This device will have the monitor and controller plug into the auxiliary or cigarette lighter port.



Student: Nicholas Burnett

Student Status: Undergraduate

Major: Biology

Advisor: Dr. Anuradha Ghosh

Title: Ecology and Prevalence of Ticks and Tick-borne Bacterial Pathogens in a Peri-urban Landscape of the Midwestern U.S.

58

Abstract:

Ticks transmit a wide variety of pathogens including viruses, bacteria, protozoa, and helminthes to vertebrates. Their life cycle depends on blood meals from various hosts as well as on environmental conditions such as the temperature and habitat type. The present study proposed to assess the prevalence of various tick species and infection prevalence of bacterial pathogens causing Lyme, Anaplasmosis, Ehrlichiosis, Rickettsiosis, Tularemia within the tick community of the peri-urban area in southeast Kansas and adjacent areas of Missouri and Arkansas. Over 1500 ticks were collected during warmer months of 2016 (May-August) from three types of tick habitats (woodland, open grassland and woodland/grassland ecotones) using the flag-drag method. Sampling sites were mostly within 50 miles periphery of Pittsburg area; except a few outliers. Following the identification key, 1006 ticks including adults and nymphs were so far sexed and identified in the laboratory. Majority of these were identified as *Amblyomma* spp. (51.3%; male 164, female 243, nymph 109) followed by *Dermacentor* spp. (47.2%; male 213, female 223, nymph 39) and *Ixodes* spp. (1.5%). The ticks were surface-sterilized and total genomic DNA is currently being extracted from the adult ticks; and will be subjected to PCR amplification using bacterial species-specific primers. Microclimate data as well as landscape fragmentation pattern will be analyzed using GIS-based monitoring method. It is comprehensible that a better understanding of the variations in tick-pathogen prevalence is crucial for implementing sound surveillance and management programs and to understand risk for human/animal diseases.



Student: Kylie Carnahan

Student Status: Undergraduate

Group Member: Emily Fry

Major: SSRM

Advisor: Dr. Christine Brodsky

Title: Campus Tree Ecosystem Services: Carbon Sequestration and Student Cognition

59

Abstract:

Trees are widely known to provide a variety of ecosystem services in urban ecosystems. University campuses may act as small urban centers, and their environmental effects not only impact the students but also the surrounding community. We asked what ecosystem services university trees provide and how they act as a sustainability measure for the surrounding community by quantifying: 1) carbon sequestration, and 2) student cognitive health. Methods to record data included tagging the trees with aluminum numbered markers, gathering GPS locations, measuring the tree's height with a clinometer, and diameter with a D-tape. The cognitive portion consisted of a backward digit-span task (DSB) and Positive and Negative Affect Schedule (PANAS) tests to assess cognitive capabilities and emotions before and after a 20-minute walk around the tagged trees. Since July, we have tagged 265 trees and identified 57 species on Pittsburg State University's campus. Twenty students have completed the cognitive portion, and our preliminary results show a slight significant difference in memory following the nature walk (paired t-test, $t = 2.16$, $P = 0.055$). The results indicate intrinsic as well as monetary value of the trees for students. These results will benefit the university with future landscaping decisions, as well as provide data for future projects by students. By incorporating the geographic information system (GIS), we can provide maps along with attribute tables that will show case the diversity of tree species and as well as visual hotspots of tree species.



Student: Andrew Chesney
Student Status: Undergraduate
Major: Chemistry
Advisor: Dr. Irene Zegar

60

Title: Drug Targeting of the Long Noncoding RNA XIST Found to be Involved in the Maintenance and Invasiveness of Various Cancer Cells

Abstract:

XIST is a long noncoding RNA that is found on the X chromosome of mammalian organisms and is known to be involved in the inactivation of one of the female's X chromosomes in a process called Dosage Compensation which aims at equalizing gene expression among the sexes. However, abnormal expression of XIST has been found to result in its up regulation in several cancer cells. It has been established that the 5' region of the XIST is essential for its role in the X chromosomal inactivation and in the growth and proliferation of cancer cells. This region consists of several copies of a highly conserved A-repeat sequence. A solution structure of a human A-repeat sequence showed that this region adopts a hairpin structure that is stabilized by a novel AUCG tetraloop fold which is believed to be essential for XIST's function. In this project we aim at targeting this region with anti-cancer therapeutic agents in an effort to destabilize XIST in cancer cells. A first step toward accomplishing this is to conduct virtual docking studies in search of compounds that bind the human A-repeat region of XIST and render it inactive in cancer cell growth and proliferation by destabilizing its tetraloop fold region. Our molecular docking study resulted in several molecules that are found to bind tightly to the human A-repeat region of XIST. Further studies will be conducted to test the effectiveness of these compounds in destabilizing XIST and their cytotoxic effect on available cancer cell lines.



Student: Lelan DeLissa
Student Status: Undergraduate
Major: Electronics Engineering Technology
Advisor: Dr. Erik Mayer

61

Title: Implementation of a Video Game Using a Field Programmable Gate Array

Abstract:

Field programmable gate arrays (FPGA) differ from typical computers in that they consist of millions of equivalent logic circuits whose connections can be customized. As such, they can be configured to perform several tasks simultaneously. For this research project, a video game was programmed that consisted of three walls, a ball, and a paddle. Each element of the game was implemented using a separate digital circuit on the FPGA. The circuit for the ball updated the position of the ball and changed its direction when it was at a wall or if it was at the same location of the paddle. The circuit for the paddle updated its position depending on whether an up or down button was pressed. A third circuit received the positions of the ball and paddle and drew them onto the game board that is displayed on a VGA monitor. The advantage to using a FPGA is that the calculation of the ball position was done by a separate circuit than that of the paddle. Thus, the speed of the ball did not affect the update of the paddle display and vice versa. Video games with a large number of elements can potentially be implemented on an FPGA. If each element is configured in an individual circuit, the speed of each element will not affect the others.



Student: Rebekah Elliott
Student Status: Undergraduate
Group Member: Dr. James McAfee
Major: Biology

Advisor: Dr. Irene Zegar

Title: Investigating Potential Anti-Cancer Drugs Targeting MALAT1, lncRNA Upregulated in Late-Stage Cancers

62

Abstract:

MALAT1 is a long non-coding RNA known to be upregulated in cancer tissues with a correlation to increased levels during late-stage cancers. It is hypothesized the molecule may act as a transcription regulator for various genes, including those involved in cancer metastasis and cell migration, but it has been proven to be involved in cell regulation. First found to be associated with metastasis of lung cancer, large amounts are also found in adrenal cancer and other cancer tissues, but the mechanism is still poorly understood. The target of this study is the triple-helical region, known as the 3' end, which lacks the canonical poly(A) tail and enhances the molecule's stability. With the expression of MALAT1 correlating to hyper-proliferation and metastasis, the aim is to find therapeutic agents that could destabilize the structure at the 3' end and therefore, hinder the progression of cancer cells reaching metastasis. Cancer drugs could be developed using these results to treat multiple forms of late-stage cancer. The first stage of this project has already been completed with the virtual screening approach resulting in more than 50 molecules being found with bonding affinities (K_a) to this segment of the RNA of 1.0×10^9 and higher. In the second stage, MTT assays confirmed the viability of four out of the five small molecules chosen from the original 50. The focus now is further confirmation using triple-negative cancer cells as well as A549 to further assess and validate the potential of these molecules as anti-cancer drugs.



Student: Robin Goodreau
Student Status: Undergraduate
Group Members: Nathaneil Skinner and Jake Wright
Major: Biology

Advisor: Dr. Christine Brodsky

Title: Park Visitor Perceptions of Nature in Southeast Kansas

63

Abstract:

The management of our natural resources is often a complex task, as many actions have direct or indirect human consequences. Not only do natural resource managers have to evaluate species' needs and the quality and availability of habitats, the human dimension of the resource needs to be integrated into planning and management efforts. As our society becomes more diverse and urbanized, natural resource agencies should understand stakeholder values and behaviors in order to manage the resource in an informed, adaptive manner. In collaboration with the Kansas Department of Wildlife, Parks, and Tourism (KDWPT), we developed a survey to assess the demographics and environmental values of visitors to the Southeast Kansas Nature Center in Galena, KS. The Center and surrounding parkland provide a diverse array of resources to park visitors, threatened and endangered herpetofauna, and rich bird community. Data is currently being collected by students in the Human Dimensions of Natural Resources Management class at Pittsburg State University. We are utilizing a convenience sampling methodology in which any adult visitor to the SE KS Nature Center will be given a face-to-face survey. We anticipate presenting data on how park visitors found out about the Center, how visitors utilize the park, their interests in the environment, and how they perceive various aspects of nature. Data will be used by the director of the SE KS Nature Center to inform their park management objectives and actions, promotional materials, and relationships with park visitors.



Student: John Hey

Student Status: Undergraduate

Group Member: Sanket Bhoyate and Dr. Ram Gupta

Major: Biology

Advisor: Dr. Anuradha Ghosh

Title: Screening of Polyacrylonitrile Nanofibers Infused with Silver and Other Allied Nanoparticles for Antimicrobial Applications

Abstract:

The applications of nanoparticles are virtually unlimited and the solutions offered by modern nanotechnology are becoming more widespread. Electrospinning is a well-established technique that can be used to tailor nanofibers with specific diameter to obtain desired properties. In this study, silver was used as an effective antimicrobial agent against different biological pathogens, while polyacrylonitrile (PAN) was used as a bioactive polymer that is compatible with and easily degradable by the human body. The main objectives of this study were: a) to design PAN nanofibers infused with silver and other (hydroxyapatite, copper oxide, selected antibiotics, or detergent) allied nanoparticles; b) to determine the effect of prepared infused nanofibers on the viability of antibiotic-resistant bacterial strains and pathogenic fungal strains. The PAN nanofibers were prepared in 10% PAN solution by electrospinning process. In order to embed the silver particles in nanofibers, silver precursor was added to make different solutions with 2%, 6%, and 10% concentration. The fibers were then subjected to UV irradiation for 2 hours to obtain active silver nanoparticle embedded PAN nanofibers. Selected microbial strains were spread plated on Mueller-Hinton agar. Sterile discs impregnated with infused PAN nanofibers were placed and incubated at various temperatures and for different time periods. The zones of inhibition were recorded and charted for comparison. Further, the effect of infused nanofibers with potential antimicrobial activity on biofilm formation as well as on mammalian cell lines will be evaluated. The outcome of this study should have implementation in biomedical sciences and technology.



Student: Vedant Jain

Student Status: Undergraduate

Major: Biology

Advisor: Dr. Santimukul Santra

Title: Targeted and Specific Treatment of Non-Small Cell Lung Cancer Using Folic Acid Conjugated Nanoceria

65

Abstract:

Non-Small-Cell Lung Cancer (NSCLC) accounts for 25% of the lung cancer related deaths in each year. Hsp90, a ubiquitously expressed molecular chaperone is considered to be a promising target for therapeutic intervention. Ganetespib, an Hsp90 inhibitor has been shown to have superior anti-tumor activity in several K-RAS mutant NSCLC cell lines. In addition, lactonic sophorolipids (LSL), a class of chemo-enzymatically modified glycolipids, are known to be promising immunomodulators and have shown to decrease the mortality rate in rat model of sepsis by down-regulating pro-inflammatory cytokines. Recent studies have also demonstrated the anticancer activity of LSL on several cell lines including esophageal, lung and pancreatic cancer cells and are known to be potent anti-cancer agents by inhibiting histone deacetylases (HDAC). Herein, unique drug cocktail comprising of ganetespib and LSL targeting Hsp90 signaling and HDAC pathways will be used for NSCLC therapy. Owing to its redox active properties, nanoceria (NC) will be specifically used as the drug delivery platform to supplement the therapeutic potency of the drugs along with ganetespib and LSL and is designed in a way to prevent cell migration thereby inhibiting the metastatic nature of the lung cancer cells. The HDAC inhibition pathway of LSL, cell differentiation, cellular cytotoxicity and other cell-based assays were performed to evaluate the anti-tumor efficacy of the proposed drug cocktails in the treatment of cancer and will be discussed in this presentation.



Student: Kelly Mallatt

Student Status: Undergraduate

Major: Biology

Advisor: Dr. Christine Brodsky

Title: Remediation of Tar Creek: Impacts on Bird and Plant Community Diversity

66

Abstract:

The Tar Creek Superfund Site in Picher, Oklahoma was once the world's largest lead and zinc mining areas. Declared a Superfund site in 1983, the Environmental Protection Agency is now tasked with cleaning up mining waste and remediating the sites through soil replacement and planting native grass mixtures. In this study, we asked how habitat remediation of a heavy-metal contaminated area impacts biological diversity, specifically for bird and plant communities. We surveyed 22 locations at the Tar Creek Superfund site in various stages of remediation. We sampled each location's vegetation and bird communities in May - July 2017 and analyzed community data through Bray-Curtis ordination plots, and a series of regression and ANOVA analyses. We observed 59 bird species and 21 tree species across the mined area. The remediated locations were composed of grasses and forbs, in contrast to the un-remediated locations which were dominated by mining waste or trees and shrubs. Remediation efforts attracted more bird species to the sites, particularly for sites with more grass and forb cover. The unremediated sites with trees and grass/forbs also had abundant bird communities, indicating the importance of plants for the bird community (e.g. food, nesting, cover resources). Species communities differed across remediation category, often following bird species' life history traits and habitat associations. Future portions of this study will analyze the human dimensions and health impacts of remediation efforts in the Tar Creek community, particularly for Quapaw Tribe residents.



Student: Tucker Morey

Student Status: Undergraduate

Group Members: S. Bhoyate, Gautam Gupta, S. R. Mishra, Brooks Neria,
Soubantika Palchoudhury, Felio Perez, Venkata Vasiraju, Z. Wang, and C. Zhang

Major: Chemistry

Advisor: Dr. Ram Gupta

Title: Hydrogen Evolution Reaction Using MoS₂ Decorated Nanofibers

Abstract:

Hydrogen is one of the most efficient and renewable energy resources which can be generated efficiently via water splitting. However hydrogen evolution occurs at high overpotential, and efficient hydrogen evolution catalysts are desired to replace state-of-the-art catalysts such as platinum. Here, we report an efficient and stable electrocatalyst that has low overpotential, efficient charge transfers kinetics and low Tafel slope. Polymeric nanofibers were synthesized by electrospinning polyacrylonitrile followed by carbonization. The carbonized polymeric fibers were decorated with MoS₂ using a facile hydrothermal process. Microstructural analysis of MoS₂ decorated fibers showed flower-like morphology with vertical pedals. Hydrogen evolution reaction of MoS₂ decorated over polymeric fibers was compared with MoS₂ without any fibers and with commercial MoS₂. MoS₂ grown over fibers and MoS₂-synthesized produced about 374 and 98 times higher current density at -0.30 V compared with the MoS₂-commercial sample, respectively. The enhanced catalytic activities of polymeric nanofibers decorated with MoS₂ is due to large electroactive surface area, more exposure of edge sulfur to the electrolyte, and easy charge transfer from MoS₂ to the electrode through conducting fibers. Our study suggests that earth-abundant materials and the cost-effective process can be combined to produce efficient electrocatalysts for hydrogen production via water spitting.



Student: Tucker Morey

Student Status: Undergraduate

Group Members: S. Bhoyate, Gautam Gupta, S. R. Mishra, Brooks Neria,
Soubantika Palchoudhury, Felio Perez, Venkata Vasiraju, Z. Wang, and C. Zhang

Major: Chemistry

Advisor: Dr. Ram Gupta

Title: MoS₂ Decorated Carbon Nanofibers as Efficient and Durable Electrocatalyst for Hydrogen Evolution Reaction

Abstract:

Hydrogen is an efficient fuel which can be generated via water splitting, however hydrogen evolution occurs at high overpotential, and efficient hydrogen evolution catalysts are desired to replace state-of-the-art catalysts such as platinum. Here, we report an advanced electrocatalyst that has low overpotential, efficient charge transfers kinetics, low Tafel slope and durable. Carbon nanofibers (CNFs), obtained by carbonizing electrospun fibers, were decorated with MoS₂ using a facile hydrothermal method. The imaging of catalyst reveals a flower like morphology that allows for exposure to edge sulfur sites to maximize the HER process. HER activity of MoS₂ decorated over CNFs was compared with MoS₂ without CNFs and with commercial MoS₂. MoS₂ grown over CNFs and MoS₂-synthesized produced about 374 and 98 times higher current density at -0.30 V (vs. Reversible Hydrogen Electrode, RHE) compared with the MoS₂-commercial sample, respectively. MoS₂-commercial, MoS₂-synthesized and MoS₂ grown over CNFs showed a Tafel slope of 165, 79 and 60 mV/decade, a capacitance of 0.99, 5.87 and 15.66 mF/cm², and turnover frequency of 0.013, 0.025 and 0.54 s⁻¹, respectively. The enhanced performance of MoS₂-CNFs is due to large electroactive surface area, more exposure of edge sulfur to the electrolyte, and easy charge transfer from MoS₂ to the electrode through conducting CNFs.



Student: Abigail Morgan
Student Status: Undergraduate
Major: Biology
Advisor: Dr. Philip Harries

69

Title: Construction of a Bacterial Biosensor for Detection of Lead in Environmental Samples

Abstract:

Lead mining and zinc smelting operations in Southeast Kansas during the late 18th and early 19th centuries left substantial amounts of soil and water in the area contaminated with lead. Although reclamation efforts have been ongoing for many years such contamination still poses a serious risk to human health. In order to detect lead in water or soil samples, gas chromatography and atomic absorption spectrometry must typically be used. These techniques require specialized training as well as sophisticated and expensive instrumentation. Here we outline plans to engineer a lead biosensor using *Escherichia coli* (*E. coli*) bacteria. The use of a biosensor would allow detection of lead by simply adding a potentially contaminated sample to a growing culture of bacterium. This approach would be simple and cost effective. Our lab has recently joined the International Genetically Engineered Machine labs program (iGEM). This offshoot of synthetic biology makes use of standardized "parts" created by labs around the world. Each part is a plasmid containing some biological element (promoter, gene, ribosome binding site, etc) and all parts can be combined in any desired order utilizing a standardized cloning protocol. The primary advantage of this approach is that it enables rapid creation of engineered microorganisms via a community approach to bioengineering. Since we are new to this program we will present our preliminary attempts to optimize protocols by creating *E. coli* capable of expressing a reporter protein. We will also outline future plans to use these optimized protocols to create a lead biosensor from existing iGEM parts.



Student: Oleksandra Pashchenko
Student Status: Undergraduate
Major: Biology and Chemistry
Advisor: Dr. Santimukul Santra

70

Title: Rapid Detection of Zika and Dengue with Functionalized Magnetic Nanosensors

Abstract:

Zika has come to the forefront of world's attention in the recent years. While an infection is most commonly asymptomatic, there have been reported cases of microcephaly and Guillain-Barre syndrome, therefore it has become necessary to diagnose a zika infection quickly. Furthermore, due to the similarities between zika (ZIKV) envelope and dengue (DENV) envelope proteins, it is difficult to differentiate between the two. We attempted to detect and differentiate between ZIKV and DENV by doing binding studies utilizing our magnetic relaxation platform with customized iron oxide nanoparticles conjugated with various antibodies such as ZIKV antibody, DENV antibody, zika NS1 antibody, and dengue NS1 antibody. These magnetic relaxation nanosensors (MRNS) were able to detect ZIKV envelope proteins, utilizing ZIKV and DENV antibodies. Furthermore, with somewhat ambiguous results, we were able to differentiate using ZIKV and DENV NS1 antibodies.



Student: Derek Scholes
Student Status: Undergraduate
Group Member: Nathaneil Skinner
Major: Biology
Advisor: Dr. Andrew George
Title: Status and Population Trends of the Gray Bat Colony in Pittsburg, KS

71

Abstract:

White-nose syndrome (WNS) is a deadly disease that infects several North American bat species, including the federally endangered gray bat (*Myotis grisescens*). Kansas' only known gray bat colony, which represents the northwestern-most extent of the species' range, has not been monitored since the emergence of WNS, and the status of the colony is unknown. We initiated a study to determine the current status of the colony and evaluate seasonal population trends. We constructed an infrared video system to conduct weekly emergence counts at two known exit sites from May - October, 2017. Our results showed that the Pittsburg gray bat colony was represented by a maternal colony from May to July, with approximately 250 bats present. In August, a bachelor colony joined the maternal colony, and peak totals jumped to over 1,600 bats on September 11. A majority of the bats departed for hibernacula by October. These numbers fall below historical highs of over 5,000 individuals, but are higher than other years. No indication of WNS was found, but further population assessments and more in-depth tests will be conducted in 2018 to determine the trajectory of the population and presence of WNS.



Student: Lok Shrestha
Student Status: Undergraduate
Major: Biology
Advisor: Dr. Santimukul Santra
Title: One-Step Synthesis of Functional Polymer for Targeted Drug Delivery

72

Abstract:

In this study, we report various biodegradable polyester polymers with tunable physical properties for drug delivery applications. These polymers were designed in such a way that only bio-based starting materials (for example, sorbitol, hexanediol, glutaric acid) were used as monomers. We have introduced alkene functionality to the polymer in order to perform various surface functionalization for targeted delivery. Furthermore, we have used enzyme catalyst for the polymerization reaction to follow green chemistry approaches and to avoid any toxic catalyst in the polymer. The resulting polymers were purified using solvent precipitation method and characterized using spectroscopic techniques such as NMR, FT-IR, GPC, TGA and MALDI-TOF. In addition, to evaluate the potential biomedical applications, anticancer drug and optical dye encapsulating polymeric nanoparticles were fabricated for in vitro cytotoxicity studies using various healthy and cancer cell lines. Various cell-based experiments, drug release study and other important results will be summarized in this presentation.



Student: Ryan Walker
Student Status: Undergraduate
Major: Biology
Advisor: Dr. Mandy Peak
Title: Analyzing the Gut Microbiome of Human Populations in Southeast Kansas

73

Abstract:

The human microbiota is a mutualistic relationship between the human body and microbial cells. These cells distribute themselves along the internal and external surfaces of the human body. These surfaces and their respective microbiota can be divided into regions, an example being the human gut microbiome. The microbial cells in this region largely outnumber the cells of the human host and perform a multitude of functions for the host. They have major roles in host protection and immune system development, but they are also implicated in diseased states. Their exact function in these states is not yet known. The study of the gut microbiome of residents in Crawford County and the surrounding communities, stems from a larger study conducted in other, larger cities. These studies have shown that certain diseases are correlated with microorganisms isolated from human samples. With the samples obtained from Southeast Kansas and Southwest Missouri, we plan to analyze the gut microbiome. The samples were raw sewage water collected from the waste water treatment plants in these areas. Selective, differential, and nutrient agar plates were inoculated directly from the samples and further differentiation of the samples was achieved by a battery of biochemical tests. The tests will narrow down a pool of possible 16S rRNA primers that we can use to DNA sequence and classify the organisms present.



Student: Brian Warner
Student Status: Undergraduate
Major: Computer Information
Advisor: Dr. Bruce Warner
Title: eXpTools 3 Response Box

74

Abstract:

eXpTools 3 is a ground-up rewrite of eXpTools, a C++ library used for animation, tachistoscopic presentation, and response timing for psychological research in human cognition and perception. Additionally, a response box has been added to eXpTools. The response box defines a container class that is transmitted from the host PC to the microcontroller and vice-versa using raw HID, allowing driver-free usage. The class allows functions to be called for the microcontroller to perform and holds onto button presses and corresponding response times that the microcontroller collects. The response box receives commands in its first three bytes of memory and returns a command sequence in an array of 12 5-byte values (therefore using the most memory allowed by raw HID). How the memory is used in these sequences is defined by each command. Some of the most vital functions are Start, which resets the timer and starts key capture, Get, which returns keystrokes from the queue, and Key Mask, which allows the user to set which keys are active (up to seven may be used). By using efficient programming and light sensors that detect the arrival of stimuli on the screen, responses are timed to microsecond accuracy - even when using a monitor that stores image contents in a buffer before refreshing them to the screen. eXpTools 3 uses C++ for the USB device and raw HID interface, SFML for graphics, audio, and GUI, and a C++ binding layer to Lua for simple, high-level, end-user implementation.



Student: Lucy Lotspeich

Student Status: Graduate

Group Members: Kasey Beeman, Cody Bryant, Phillip Foust, Forest Joseph,
and Andrea Kent-McConnaughey

Major: Graphics Management

Advisor: Mr. Rion Huffman

Title: Impact of Enchroma Glasses on Color Acuity

Abstract:

Constantly we are surrounded and interacting with color; color has emotion and meaning. In the graphics industry, color is used in communication, to draw attention and set the tone of a design. However, not everyone can see color. Every day someone fails to see and interact with color accurately due to color deficiencies. The inability to see color accurately could hinder one's success in the graphics industry. In 2010, Enchroma Inc. introduced glasses that enhance color vision for people with color deficiencies. Questions arose surrounding the functionality and ability of the glasses, and to what significance. Through our proposed research we hope to identify if the Enchroma glasses can portray colors accurately and correctly. To conduct this study, participants will be asked to take part in two different color tests: The Farnworth-Munsell 100 Hue Test (FM 100) and the Ishihara Color Test. Once the participants have finished the tests, the participants will be asked to take the tests again, this time using the Enchroma glasses. Once both rounds of testing are complete, results from both tests will be compared to see if there was an impact on the individual's color vision. If the glasses have a statistically significant impact on individual's ability to see accurate color then the glasses would be a benefit for all individuals making color critical decisions in the graphics industry not just those with identified color deficiencies.



Student: Laura Moldazhanova

Student Status: Graduate

Major: Teaching English Language

Advisor: Mrs. Roza Zhussupova

Title: Content Language Integrated Learning for Developing English Skills of ELLs

Abstract:

The research scrutinizes the CLIL (Content Language Integrated Learning) technology's advantages and its application for teaching ELLs in the subject classroom. The main peculiarities of the CLIL methodology, Edmodo virtual platform's peculiarities the features of the subject lesson are considered. The research contains recommendations for English language fellows and the description of other teachers and the personal experiment and of using CLIL at the lesson. The Aim is to identify the ways and possible challenges of using Edmodo in the development of ELL's English skills in the subject classroom and to propose own suitable measures of tackling this issue. The Objectives are: to analyse theoretical matter on the topic to outline the practical use of social network Edmodo and possible difficulties of its implementation in the subject traditional To propose methodological model of using Edmodo in the subject classroom to develop Target Language (TL) English skills. Conclusions. The research provides the results and comparison of Edmodo's implementation at lessons as well as the results of the survey about use and benefits of Edmodo.



Student: Sreerupa Sanyal

Student Status: Graduate

Major: Communication

Advisor: Dr. Troy Comeau

**Title: An Analysis on News Reading and News Sharing Among Students and Staff of
Pittsburg State University**

77

Abstract:

This research study examines the news reading and news sharing patterns of students/staff at PSU. It specifically focuses on the impact of social networking sites (SNSs) in news reading and news dissemination among the students/staff. The rise of social SNSs has brought in a revolution about how news is received, shared and consumed. Every major newspaper and television channel has a social media presence. University students are a key component in examining and analyzing news reading and news sharing patterns. However, no comprehensive study has been done on news reading, news sharing, social media usage and utilizing SNSs for consumption and dissemination of news among university students/staff. Therefore, this work was an attempt to understand the underlying patterns, if any, related to the above four variables. A survey was conducted among students/staff members at PSU. 111 surveys were considered for the final study. Building on the concepts of news gap (Boczkowski and Mitchelstein, 2013), social news gap (Bright, 2016) and internalizing and externalizing of news on social media (Choi, 2016), this study attempted to understand the following: social media usage among participants; participant's interest in news related topics; and patterns of sharing of news related items on social media. The study found that there was a strong correlation among participants following the internet for news and their preference of SNSs for receiving news. The study also found that while participants engaged in sharing news on their social media feed, they refrained from commenting on news items on SNS feeds.



Student: Sirena Bruner

Student Status: Undergraduate

Group Member: Madison Perez

Major: Social Work

Advisor: Dr. Hyejoon Park

Title: Factors Contributing to a Teen Mother's Choice to Attend or Not Attend College

78

Abstract:

The purpose of our study was to identify potential barriers and factors contributing to a teen mother's choice to attend or not attend college. We used a qualitative, inductive approach, utilizing personal interviews to gather information. Our study consisted of asking questions designed to gather the correlations within their choices. The methodologies we used in our study were purposive and convenient. A wide variety of questions were incorporated into the study. These questions helped identify certain understanding between the decision process of the adolescent mothers to attend or not attend college. Through our study we hoped to come up with strategies and ideas that would encourage and support teen mothers to choose to attend college. We reached out to two women who had children between the ages of 13 and 18. One of the teen mothers chose to attend college and one did not. We explored each woman's reasoning behind their choices by asking them questions about the barriers they experienced such as family income, poverty, supervision, and value of education to the family as well as the stigmas that they faced. This study overall will help identify what the problems and barriers are, and how we can help these women overcome these obstacles so success in life is possible.



Student: Jasmine Crame
Student Status: Undergraduate
Major: Elementary Education
Advisor: Mrs. Amy Bartlow
Title: Elementary Learning Progression

79

Abstract:

This project explored the learning progressions of elementary students in grades kindergarten through 5th grade. Child development was researched using developmental literature. Teachers were interviewed in elementary grades kindergarten through 5th grade to uncover how developmental progressions are evident in the classroom. Observations of five classrooms also contributed to the data collected.



Student: Max Ernst
Student Status: Undergraduate
Major: Finance/Economics
Advisor: Dr. Michael Davidsson
Title: Salary Distribution in the NFL

80

Abstract:

There are many different ways to construct an NFL lineup given a salary cap. This study looks at different salary structures to determine if there is an optimal strategy that General Managers should use when building their roster. The goal of every manager should be to have as many wins as possible in a given year. The purpose of this study is to determine if there is an optimal strategy for general managers to use to construct their lineup by looking at two main factors and their effect on the number of wins for a team: positional spending and salary inequality. Salary inequality is measured using a Lorenz Curve and a Gini Coefficient. This study used data from the Spotrac website and analyzes the 2013-2014 season through the 2017-2018 season. By analyzing a pooled regression model, this study attempted to answer if there is a superstar effect in the NFL and determine which positions are undervalued/overvalued. The findings indicate that certain positions have been overpaid and some underpaid over the last 5 NFL seasons. The results also show that there is no superstar effect in the NFL. This study aims to help NFL teams construct the best possible lineup for their team and win more games..



Student: Max Ernst
Student Status: Undergraduate
Major: Finance/Economics
Advisor: Dr. Anil Lal

81

Title: Why Modern Statistics are Better at Predicting Golfer Performance than Traditional Statistics

Abstract:

Golf, like any other sport, is very competitive. Each golfer tries to maintain or improve on their scores in order to have an edge on the competition. This is particularly important for professional golfers as, small difference in performance can lead to big differences in monetary rewards. For example, the 2017 FedEx cup champion, Justin Thomas, won 20 times more money (\$10 million) as the 10th place finisher, Brooks Koepka (\$500,000). Thus, it is important that players have access to statistics that can assess factors that contributed most to better performance in a tournament. Traditional statistics attempt to measure different types of shots to break down a player's final score (Fairways Hit, Greens in Regulation, Scrambling percentage, and number of putts). However, this data does not necessarily help a player determine where they need to improve in order to beat their fellow competitors. To alleviate this problem, Mark Broadie (2011) devised a modern statistic called, "strokes gained" which compares golfer performance to "Tour Average Benchmarks" in order to measure relative golfer performance. This paper uses official data from the PGA Tour website for the 2016-2017 PGA Tour season, and a sample of 190 qualified players. This paper analyzes the contribution of each factor, based on traditional as well as modern statistics, to a player's score. Further, the results show regression based on modern statistics provided about 45.9% better estimates than those based on traditional statistics. A number of plausible explanations consistent with the findings are provided and it is hoped that the results will be useful to golfers as well as researchers in this area.



Student: Brenna Hoppes
Student Status: Undergraduate
Group Members: Josh Brown and Jennifer Johnson
Major: Psychology
Advisor: Dr. Jamie Wood

82

Title: Documentation for Accommodations for College Students with ADHD: Commonly Missing Elements in Reports from Health/Mental Health Professionals

Abstract:

Professional's reports supporting accommodations for college students with ADHD were analyzed for sufficiency of documentation to support the diagnosis and frequency of contemporary adult criteria use. Findings indicate incomplete documentation, minimal adoption of contemporary criteria, and significant differences in the meticulousness of different types of health/mental health practitioners.



Student: Blake Hudson
Student Status: Undergraduate
Major: Business Management, Marketing
Advisor: Dr. Lynn Murray
Title: Boulevard Brewing Company Market Analysis

83

Abstract:

Extensive market research on Boulevard Brewing Company. The extensive market research consists of competitive research and a PESTLE analysis of Boulevard Brewing Company. Competitive research consists secondary data and an industry analysis, to determine the overall market size and trends. PESTLE analysis looks into how Political, Economic, Social, Technology, Legal, and Environmental trends affect the beer industry market. Providing an extensive look into the macro-environment of Boulevard Brewing Co. Boulevard Brewing Co. is a Kansas City brewing company that has grown to be the largest specialty brewer in the Midwest.



Student: Amy Mitrisin
Student Status: Undergraduate
Major: Social Work
Advisor: Dr. Hyejoon Park
Title: How Technology Effects Students' Academically

84

Abstract:

Using surveys, we are testing if leisure use of technology in the classroom has an impact on students' grades and attentiveness. We will survey professors at Pittsburg State University asking if they notice a change in students' grades and attentiveness with the use of technology in the classroom. We hypothesize that there will be a decrease in grades and attentiveness with the advancement of technology. In terms of utilizing a quantitative method with forty professors, we collected answers on the relationships between students' grade and attentiveness. Our research findings will be extended for future research, educational settings, and policy makers decisions.



Student: Madeline Prachyl
Student Status: Undergraduate
Group Members: Karen Boulanger and Ashley Roberts
Major: Social Work
Advisor: Dr. Hyejoon Park
Title: Success Rate for Non-Traditional Students Versus Traditional Students

85

Abstract:

The purpose of this qualitative study is to find the academic success rate for non-traditional students versus traditional students at the college level. Research will be utilized from scholarly articles and study results from a sample of six interviews. The sample will consist of interviewing three non-traditional college students and three traditional college students. Closed and open-ended question will be utilized during the interview process. The results of this qualitative study will show different barriers and transitions faced by non-traditional and traditional students. From the research findings, we can recommend ways to improve the well-being of non-traditional students in academia, for the development of higher institutions.



Student: Olivia Stiens
Student Status: Undergraduate
Group Member: Ashlin Wait
Major: Social Work
Advisor: Dr. Hyejoon Park
Title: The Effects of Substance Use in College Students

86

Abstract:

This qualitative study tested social, professional, and school functioning among college-aged student, we explored whether substance use or abuse has affected two students. One participant chosen will be a college male student in their junior year that has not used substances throughout college. The other participant will be a college female student in their junior year that has used substances throughout college. We will interview our participants based on how they feel physically and emotionally, as well as explore the correlation between substance use and the number of absences in class, college grade point average (GPA) throughout their freshman year to the present, job performance, and the quality of personal relationships. Our findings will give more insight in assisting the at-risk college students more likely to be exposed to substance abuse and be affected by it negatively.



Student: Ryan Urban
Student Status: Undergraduate
Major: Communication
Advisor: Dr. Troy Comeau
Title: Linking Pokemon to Positivity

87

Abstract:

In a study in both qualitative and quantitative methods, Pokémon is found to be potentially linked to happiness in the form of positive escapism, Oldenburg third places, and parasocial relationships. This is found through the use of eight interviews between gamers, and one hundred surveys done by the gamers of the Pokémon franchise.



Student: Willie Cowley
Student Status: Undergraduate
Major: Illustration
Advisor: Mrs. Portico Bowman
Title: The Brainy Bunch

88

Abstract:

My artwork has two key components. Characterization and empathy. To me, a work can appeal to the eye, yet it still fails so long as no feeling of empathy or understanding is achieved. Truly, life is a matinee with each act a decision and each actor a raw, emotionally complex study. I wish to help display these showcases of emotion and choice by depicting them through ink and, on occasion, color. Happiness, sadness, anger, confusion, I aim to place all of them in the limelight through character design, storytelling, and comic art. There are times when a person's inner self and emotions can be understood through certain depicted circumstances. Whether these events are seen in a humorous way or not, they will provide a mirror to gaze into at the end of the day where it is possible to discover what is hidden deep within the chambers of their heart and mind.



Student: Christopher Griffetts
Student Status: Undergraduate
Major: Illustration
Advisor: Mrs. Portico Bowman
Title: The Brainy Bunch

89

Abstract:

Life is a series of challenges and journeys that shape us as individuals. My experiences change my illustrations into new worlds. They tell a story. My Life. I wish to share those ideas. Dark science fiction or a tragic event can demonstrate how worlds are destroyed. My work can change how my audience views the world. Art is how I question and learn, so that I can grow both as an individual and as an artist.

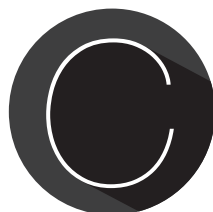


Student: Christen Ireland
Student Status: Undergraduate
Major: Fine Art
Advisor: Mrs. Portico Bowman
Title: The Brainy Bunch

90

Abstract:

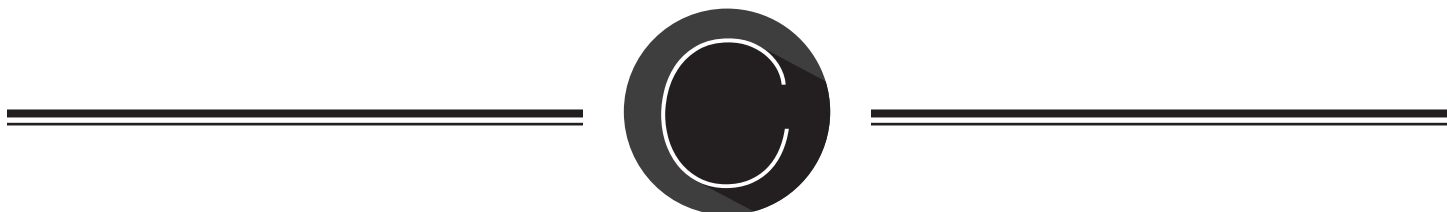
Children have deep emotions and are easily influenced by the world around them. A variety of situations can initiate multiple responses. This is especially true with children who have a disability related to social and emotional issues. By developing toys and games, children who have these issues, such as autism, depression, and social anxiety will be able to interact socially and learn to cope emotionally as most people do. With the use of textile toys and games the challenging task is worthwhile and fun. Through my research on the subject multiple counselors have expressed the importance of play in a child's life my work will help them with that important stage of their life.



Student: Levi Qualls
Student Status: Undergraduate
Major: Visual Art and Storytelling
Advisor: Mrs. Portico Bowman
Title: The Brainy Bunch

Abstract:

Using character and legends from Greek myths, such as Hercules and the Hydra or Perseus and Medusa, I intend to make the reader feel as though they belong within the story they are reading. I want them to feel as though they are the one swinging the sword or manning the Argo from Jason and the Argonauts. I want to take these myths from the back of our minds and create stories a reader can be engage with reading after reading, year after year. These myths were more than just stories to me growing up. They became the world where I lived. I want to make the stories live for my readers in the same way.



Student: Ahlam Alghamdi

Student Status: Graduate

Major: Chemistry

Advisor: Dr. Ram Gupta

Title: Hierarchical Core-Shell NiCo₂O₄@NiMoO₄ Nanowires Grown on Carbon Cloth as Integrated Electrode for High-Performance Supercapacitors

92

Abstract:

Hierarchical core-shell NiCo₂O₄@NiMoO₄ nanowires were grown on carbon cloth (CC@NiCo₂O₄@ NiMoO₄) by a two-step hydrothermal route to fabricate a flexible binder-free electrode. The prepared CC@NiCo₂O₄@ NiMoO₄ integrated electrode was directly used as an electrode for faradaic supercapacitor. It shows a high areal capacitance of 2.917 F/cm² at 2 mA/ cm² and excellent cycling stability with 90.6% retention over 2000 cycles at a high current density of 20 mA/cm². The superior specific capacitance, rate and cycling performance can be ascribed to the fast transferring path for electrons and ions, synergic effect and the stability of the hierarchical core-shell structure.



Student: May Altammar

Student Status: Graduate

Major: Chemistry

Advisor: Dr. Ram Gupta

Title: Triboelectrification-Induced Large Electric Power Generation from a Single Moving Droplet on Graphene/Polytetrafluoroethylene

93

Abstract:

Recently, several reports have demonstrated that a moving droplet of seawater or ionic solution over monolayer graphene produces an electric power of about 19 nW, and this has been suggested to be a result of the pseudocapacitive effect between graphene and the liquid droplet. Here, we show that the change in the triboelectrification- induced pseudocapacitance between the water droplet and monolayer graphene on polytetrafluoroethylene (PTFE) results in a large power output of about 1.9 μW, which is about 100 times larger than that presented in previous research. During the graphene transfer process, a very strong negative triboelectric potential is generated on the surface of the PTFE. Positive and negative charge accumulation, respectively, occurs on the bottom and the top surfaces of graphene due to the triboelectric potential, and the negative charges that accumulate on the top surface of graphene are driven forward by the moving droplet, charging and discharging at the front and rear of the droplet.



Student: Sanket Bhoyate

Student Status: Graduate

Group Members: Kwadwo Mensah-Darkwa, and Pawan Kahol

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: Recent Development on Nanocomposites of Graphene for Supercapacitor Applications

94

Abstract:

A tremendous amount of research work has been done over the past decade to explore the potential of graphene for energy applications including its use in supercapacitors because of its unique characteristics such as: novel charge transport behavior, superior electrical and thermal conductivity, good chemical stability, outstanding mechanical behavior, and above all its tunable interlayer spacing. A variety of ions has intercalated into the graphene layers without damaging its structure suggesting structural stability and durability for energy storage applications. Although the energy storage capacity of pure graphene is low, its charge storage capacity can be improved by synthesizing nanocomposites of graphene with polymers, metal oxides, and carbon-based materials. Nanocomposites with conducting polymers such as polyaniline, polypyrrole and polythiophenes can provide various nanostructures with improved electrochemical properties compared to pure graphene and conducting polymers. On the other hand, metal oxides provide ultra-high faradic capacitive performance and other carbon-based materials help in creating complex nano-structural morphology for enhanced energy storage capacity.



Student: Camila Muliterno Zequine

Student Status: Graduate

Major: Polymer Chemistry

Advisor: Dr. Ram Gupta

Title: High-Performance Flexible Supercapacitors Obtained via Recycled Jute: Bio-Waste to Energy Storage Approach

95

Abstract:

In search of affordable, flexible, lightweight, efficient and stable supercapacitors, metal oxides have been shown to provide high charge storage capacity but with poor cyclic stability due to structural damage occurring during the redox process. Here, we develop an efficient flexible supercapacitor obtained by carbonizing abundantly available and recyclable jute. The active material was synthesized from jute by a facile hydrothermal method and its electrochemical performance was further enhanced by chemical activation. Specific capacitance of 408 F/g at 1 mV/s using CV and 185 F/g at 500 mA/g using charge-discharge measurements with excellent flexibility (~100% retention in charge storage capacity on bending) were observed. The cyclic stability test confirmed no loss in the charge storage capacity of the electrode even after 5,000 charge-discharge measurements. In addition, a supercapacitor device fabricated using this carbonized jute showed promising specific capacitance of about 51 F/g, and improvement of over 60% in the charge storage capacity on increasing temperature from 5 to 75 °C. Based on these results, we propose that recycled jute should be considered for fabrication of high performance flexible energy storage devices at extremely low cost.



Student: Jose Parlade
Student Status: Graduate
Major: Clinical Psychology
Advisor: Dr. Gwen Murdock

96

Title: The Effects of 3D and Action-Platform Video Games on the Hippocampus and Caudate Nucleus

Abstract:

In 'Video Games and Hippocampus-Dependent Learning,' by West, Konishi, and Bohbot, a correlation is drawn between the playing of 3D-platform and action-platform video games and the proliferation or degradation of gray matter in the hippocampus or caudate nucleus. The views presented are that 3D-platform games preferentially utilize allocentric spatial memory encoding whereas action-platform games utilize egocentric spatial memory encoding. These are suggested as the underlying reasons for the differential effects of 3D-platform and action-platform games on the hippocampus and caudate nucleus, respectively. However, other mostly unexplored variables may also have a part in these effects. These include differences in gaming styles among players of video games, variations among games within each platform, the experiential similarities and differences between real and virtual environments, and alternative perspectives on spatial reference frames. This study and these variables are worth exploring in order to better understand how video games and virtual environments affect our brains and what advantages, if any, they may be able to provide in a therapeutic context.



Student: Paige Peppard
Student Status: Graduate
Major: Justice Studies
Advisor: Dr. Roy Janisch
Title: Vipassana: Mindfulness in the Prison System

97

Abstract:

research is not concluded, provided is the abstract in progress The claim of the lack of efficacy of incarceration is argued to be seen in the amount of offenders that reoffend in society after being released from the long term confinement in state or federal prisons. It is also argued that this could be a result of improper education and reintegration efforts. As a remedy to the vicious cycle of reoffending, many have suggested utilizing the option of improving programming, or education or developmental enrichment opportunities, within the prison system. Through a literary review, a compilation of the benefits of mindfulness programs in the prison system and the impact of such programs on the decrease likelihood of reoffending, or recidivism, is analyzed in this exploratory research. Three types of mindful programs are discussed from empirical studies, transcendental meditation, mindfulness based stress reduction, and vipassana. Vipassana being the most significant in offered programs. These techniques show the favorable effects of meditation for both general and incarcerated populations. Additionally, narratives of observant advocates and participants are discussed and show the same positive effects. Predominantly, both research and testimony suggest that mindfulness in the prison system not only reduces recidivism but improves inmate well-being.



Student: Bailee Deviney
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: The Influence of Music in the Operating Room

98

Abstract:

Through years of research music has been shown to have proven positive effects for patients in the health care environment, but there was question if there were also beneficial effects for the health care staff. In operating rooms across America, music is sometimes played during very critical surgeries where exact precision is absolutely necessary. As the operating room can already be a stressful, noisy environment, one must consider whether there are potential harmful effects of allowing music to be played during the intraoperative period. The possible complications include alert fatigue and communication issues. However, this research review revealed these effects can be easily controlled with moderate use of the music. The most preferred soundtrack was instrumental or classical music at 60-80 beats per minute played at a low volume. Research on the use of music in the operating room has shown perceived better work efficiency that leads to benefits for the staff and, therefore, the patient. Overall the staff reported music contributes to a more positive work environment. Music can be an inexpensive way to improve aspects of care and make lives better for staff and patients in the health care field.



Student: Emily Dickey
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Long-Term Deleterious Effects of Sports-Related Concussions

99

Abstract:

The purpose of this review of literature was to examine the current knowledge base of and increase awareness of the long-term effects of sports-related concussions. It is becoming increasingly clear that concussions have a grand degenerative effect on the brain referred to as Chronic Traumatic Encephalopathy, or CTE. CTE occurs years or decades after one experiences a concussion. The individual may experience drastic behavioral changes such as depression, apathy, irritability, memory impairment, and impulsivity. A critical problem related to this condition is that the only definitive way to currently diagnose CTE is via an autopsy. However, in recent years, researchers have identified possible biomarkers of CTE like the presence of CCL11 protein and changes in white brain matter. Research is underway to discover diagnostic criteria in vivo so we can prevent the progress of the disease and develop therapies to slow or reverse the cognitive degeneration effects that CTE causes.



Student: Bailey Flora
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Delayed Cord Clamping vs. Immediate Cord Clamping

100

Abstract:

This research project is based on five articles that analyze delayed cord clamping versus immediate cord clamping. The basis of these articles is on research studies of pre-term infants in the use of these two types of cord clamping and the outcomes - both positive and negative. Delayed cord clamping versus immediate cord clamping for pre-term infants continues to be extremely controversial. The current procedure is to cut the neonates umbilical cord as soon as possible, the research behind this procedure is based on the fact that it has worked for years and is best practice. During delayed cord clamping the umbilical cord clamping is delayed 15 - 45 seconds allowing the extra blood from the placenta to enrich the baby. It is a known fact that approximately 30% of newborn's blood is left behind in immediate cord clamping. Some of the positive benefits that come from delayed cord clamping are increased iron supply, better circulatory stability and cerebral oxygenation, and a decreased risk of necrotizing enterocolitis. Some of the negative aspects of delayed cord clamping are potential mother or baby resuscitation, higher bilirubin levels, and other possible long-term effects that have not been directly linked to the delay. The blood lost in immediate cord clamping contains vital nutrients and stem cells. There is not currently enough evidence in the immediate or long-term effects of delaying the cord clamping of preterm infants. The studies conducted to date point to many positive aspects of delayed cord clamping; but, until conclusive evidence is documented, the traditional method of immediate cord clamping is the medically-approved procedure.



Student: Abby Ford
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Homeless Population Affecting the Emergency Department

101

Abstract:

The homeless population presents to the emergency department (ED) too often for their primary health care needs. They are three times more likely to visit the ED and the CDC states that approximately 90% of ED directors report overcrowding. The purpose of this study was to explore the relationship between visits to the emergency department for non-emergent health care needs and the homeless population. Many homeless individuals visiting the emergency department share common characteristics, such as alcohol/drug abuse, unstable housing, and physical/mental illness. This literature review focused on the impact of individual case managers and stable housing on the well-being of the homeless individual and whether the number of non-emergent visits could be decreased. The high number of homeless individuals presenting to the ED for non-emergent medical care is leading to overcrowding and challenges in providing the care needed to those presenting with emergency care needs. The findings from the literature revealed that if the healthcare team can provide case managers and stable housing to the homeless individuals, the number of ED visits will be decreased, thus decreasing the potential for overcrowding and high ED costs. Appropriate housing and the use of case managers can also improve the mental and physical well-being of the homeless individual.



Student: Jenna Gilstrap
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: The Impact of Nurse Staffing Ratios

102

Abstract:

The purpose of this project was to investigate the relationship between nurse overload and burnout. Hospitals frequently rely on nurses to volunteer for overtime to cover staffing shortages. This practice can lead to nurse burnout and have an adverse effect on patient safety. Literature, as well as personal experience by the researcher, reinforces that nursing shortages occur frequently. There are often not enough nurses to safely handle the patient load and many nurses are working over their 'safe' nurse-to-patient ratio. This practice is not safe for nurses or for the patients. Staff shortages cause nurses to feel stressed and can lead to feeling burnt out. Patients do not get the quality of care that they deserve when nurses are stretched too far. The literature discusses the need for states to mandate a minimum nurse-to-patient ratio so hospitals are not allowed to put such a heavy workload on nurses. Researchers have concluded that improved staffing would lower patient mortality and increase nurse retention rates.



Student: Katie Jo Hull
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Should Nurse Patient Ratios be Better Regulated to Improve Patient Outcomes?

103

Abstract:

This literature review researched the impact of lower nurse to patient ratios on improved patient outcomes as well as other positive effects. Even though there are some state regulations on nurse staffing ratios, some states do not currently have those regulations and many hospitals do not have the recommended staffing ratios due to increased numbers of patients and budgetary issues that limit the number of available nurses. Some of the benefits that have been reported with low nurse to patient ratios include improved safety and patient outcomes and improved job satisfaction. Research has also reported a decrease in the number of hospital acquired infections, decreased mortality, and less nurse burnout. The results motivates one to work to support appropriate staffing in hospitals to improve patient outcomes and increase positive effects for hospital staff.



Student: Hannah Jones
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Pediatric Pain Assessment

104

Abstract:

Nurses are a crucial component to the care of children and also in educating them and their parents on effective pain management strategies. A combination of pharmacological and non-pharmacological interventions can help get to the highest standard of care in managing pain in children. Non-pharmacological interventions include distraction methods, relaxation techniques, breast feeding, oral sucrose, and swaddling. Pharmacological interventions might include analgesics, non-steroidal anti-inflammatory drugs, opioids, local anesthetics and regional blocks. All of that also depends on age and what works best for the child in pain. This research project identifies different pain scales that are used and how important all assessments and documentation are in the management of pediatrics in pain.



Student: Grady Lenihan
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Chest Physiotherapy and Atelectasis

105

Abstract:

Hospitals today are striving to do everything possible to prevent nosocomial infections from arising. One of the most common nosocomial infections in healthcare today is pneumonia. Administration of anesthesia can impair lung function and lead to respiratory complications. Atelectasis is a possible complication of pneumonia that involves an impaired gas exchange in the alveoli. With different levels of severity, atelectasis can progress to tissue hypoxia. The research literature reviewed helps establish a relationship between chest physiotherapy treatment and postoperative atelectasis. Chest physiotherapy is used to promote airway clearance, alveolar recruitment, and ventilation/perfusion. Some of the experiments conducted were able to show evidence of a decreased incidence of atelectasis with patients who were given chest physiotherapy versus those who were issued the standard treatment of care. This project helps identify and implement emerging techniques of evidence-based care. More studies are needed with different ages and with adequate sample size to determine the amplitude of the intervention. In summary the introduction of chest physiotherapy in post op patients will reduce the incidence and severity of pulmonary complications due to decreased ventilation.



Student: Hannah Myers
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Barriers of Intimate Partner Violence Screening

106

Abstract:

The purpose of this literature review was to identify barriers nurses face when screening for intimate partner violence (IPV). The goal is to improve screening rates throughout healthcare. Although nurses are mandated to report suspicions of IPV, there is a lack of consistent screening which leaves IPV underreported. The literature review examined studies that surveyed nurses and other healthcare workers and research that discussed options for improving IPV screening. Findings indicated the need for increased education on IPV screening in nursing programs, the need for better screening tools, the importance of re-designing care environments to ensure privacy when screening, and the need to provide in-house screening workshops in care settings. In conclusion, it is critical that nurses and other health care providers implement recommended changes so that all patients are screened as part of their initial assessment and at follow-up as needed.



Student: Leslie Nichols
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Intraoperative Skin Prep Solutions

107

Abstract:

The purpose of this literature review of evidence-based research was to identify the superior intraoperative skin prep solutions in relation to incidence of surgical site infections. With surgical site infections being a prevalent problem in surgical patients leading to longer hospitalizations, increased hospital cost, and increased risk of additional complications, it is important to be up-to-date on the safest prepping solutions. The solutions compared that were reviewed included parachloroxylenol, chlorhexidine gluconate, povidone-iodine, 0.7% iodine and 74% isopropyl alcohol. The superior intraoperative solutions from this group are parachloroxylenol and chlorhexidine gluconate, accounting for the least percentage of surgical site infections. Povidone-iodine, 0.7% iodine and 74% isopropyl alcohol both produced much higher rates of surgical site infections. In summary, patients prepped with parachloroxylenol or chlorhexidine gluconate will have less incidence of surgical site infections resulting in shorter hospital stays, lower costs, and decreased mortality risk.



Student: Zion Opprecht
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Noise in the Hospital: Is it Harmful?

108

Abstract:

Noise is impossible to avoid in the hospital, but the key is to decrease prolonged loud noises and potential harmful effects. The purpose of this literature review was to assess the recommended level of safe noise and compare that with the actual noise patients and nurses experience. One aspect that was explored was whether or not the amount of noise experienced in the hospital causes an increased need for healing time in critical care patients. The research analyzed how noise affects the human body thus potentially leading to longer stays for patients and decreased effectiveness of nurses. Healthcare providers have the ability to help change the noise levels which could improve outcomes for patients. Interventions that would help decrease the overall sound while maintaining the safety of patients were discussed in the literature. Structural changes that help decrease noise in hospitals include the use of absorptive ceiling tiles, the shape of rooms, and reducing building noises. Nurses can have pagers set to vibrate, be aware of the importance of having conversations away from patient care areas, turn off televisions when a patient is sleeping, and close doors to patient rooms. Equipment can use smart alarms or light-based alarms instead of sound when possible. In summary, modifications in the healthcare setting such as these may contribute to improved patient outcomes and enhance the work area for the hospital staff by reducing the level of noise experienced on a daily basis.



Student: Jillian Otter
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Vaginal Birth after Cesarean

109

Abstract:

An estimated 23 million Cesarean procedures occur worldwide, which is a significant increase when compared to past rate. With a higher prevalence issues have arisen with subsequent deliveries and the outcomes. In fact, Cesareans have a higher mortality rate overall than vaginal births. Aside from immediate issues occurring, there will also be future issues. After having a Cesarean, women have two basic options with following pregnancies: either another Cesarean or a vaginal birth after Cesarean (also known as VBAC). Although, it is recommended that women be allowed to have a VBAC, many barriers exist restricting this procedure, thus limiting hospital-based VBACs. There is further information and research needed in regards to VBACs and their outcomes. The existing studies indicate that home VBACs have a higher neonatal death rate than hospital-based VBACs, most of which are attributed to uterine rupture. Research has also indicated that repeat Cesareans have more adverse complications than hospital VBACs. Therefore, the benefits of VBAC include more positive outcomes, and a more natural and personal delivery.



Student: Paula Ovelar Oviedo
Student Status: Undergraduate
Major: Psychology
Advisor: Dr. Chris Spera
Title: Autism Spectrum Disorder: A Review

110

Abstract:

Originally thought of as a single disorder, Autism Spectrum Disorder (ASD) encompasses a cluster of developmental disorders characterized by communication deficits, impaired social relationships and skills, and often highly ritualized and unusual behaviors. Although this disorder has been a popular area of study in the last couple of years, questions still remain regarding possible causes (e.g. prenatal versus postnatal factors), different types, and effectiveness among various treatments. This project aims to provide a detailed summary of current information about ASD, including an analysis of possible factors, causes, diagnosis, and treatments. Method/materials include an in-depth literature review of a variety of research articles published in the last decade. Conclusions indicate multifactorial causes for the development of the disorder (both genetic and environmental influences) and along with emphasizing the importance of early detection. Finally, the role of Applied Behavior Analysis on a practical level is suggested as one of the most effective treatments for this disorder.



Student: Jack Patterson
Student Status: Undergraduate
Group Members: Jill Fischer
Major: Psychology
Advisor: Dr. Julie Allison
Title: Islamophobia

111

Abstract:

The literature concerning Islamophobia, the impact it has on society, and how it has evolved in recent decades was reviewed. The purpose of this project was to determine if the prejudicial treatment that is related to Islamophobia is in fact occurring and if so, to what degree. We examined literature of all kinds to cultivate this information, including scholarly articles, news articles, and first-hand accounts. We found that while Islamophobia gradually dissipated several years after September 11, 2001, it is now steadily rising once again. This prejudice is found in work places, politics, as well as many other social situations and seems to be generalized across all persons of middle eastern decent. A key variable identified is the association of terrorism with individuals of middle eastern origin. Interestingly, findings from previous studies indicate that such individuals compose a small minority of actual terrorists.



Student: Joao Poli
Student Status: Undergraduate
Major: Chemistry
Advisor: Dr. Ram Gupta

112

Title: High Performance and Flexible Supercapacitors Based on Carbonized Bamboo Fibers for Wide Temperature Applications

Abstract:

High performance carbonized bamboo fibers were synthesized for a wide range of temperature dependent energy storage applications. The structural and electrochemical properties of the carbonized bamboo fibers were studied for flexible supercapacitor applications. The galvanostatic charge-discharge studies on carbonized fibers exhibited specific capacity of $\sim 510\text{F/g}$ at 0.4 A/g with energy density of 54 Wh/kg . Interestingly, the carbonized bamboo fibers displayed excellent charge storage stability without any appreciable degradation in charge storage capacity over 5,000 charge-discharge cycles. The symmetrical supercapacitor device fabricated using these carbonized bamboo fibers exhibited an areal capacitance of $\sim 1.55\text{ F/cm}^2$ at room temperature. In addition to high charge storage capacity and cyclic stability, the device showed excellent flexibility without any degradation to charge storage capacity on bending the electrode. The performance of the supercapacitor device exhibited $\sim 65\%$ improvement at $70\text{ }^\circ\text{C}$ compare to that at $10\text{ }^\circ\text{C}$. Our studies suggest that carbonized bamboo fibers are promising candidates for stable, high performance and flexible supercapacitor devices.



Student: Kohl Slaughter
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Evidence-Based Management of Concussions

113

Abstract:

Every year there are over four million sports-related concussions in the United States. A concussion results from a direct or indirect blow to the head causing injury to the soft tissue of the brain which disrupts normal functioning. Athletes may experience any number of the following symptoms following a concussion: cognitive, vestibular, ocular-motor impairments, confusion, dizziness, headache, or loss of consciousness. Athletes who play football, hockey, and lacrosse are at the highest risk of suffering a concussion. The purpose of this literature review was to identify the current practices in post-concussion treatment and explore new methods or guidelines for evidence-based care. Returning an athlete to play following a concussion continues to be a challenge for the health care team. The current homogeneous approach to treating the after effects of a concussion continues to cause troubling damage to the patient. Patients often receive generalized concussion care rather than care that has been individualized to the patient. The use of a multi-faceted, comprehensive approach will help clinicians better understand the patient's specific injury. A comprehensive, patient-focused protocol will allow the health care provider to match symptoms with treatment options, potentially speeding up the process for athletes to safely return to play and result in better long-term outcomes. In summary, sport-related concussions need to be treated with a heterogeneous approach to assess treatment options and to implement the best evidence-based care for the individual patient.



Student: Jodi Stuhlsatz
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Literature Review of Kangaroo Care

114

Abstract:

Before reaching four weeks of life, nearly 4 million infants die each year. Kangaroo Care is an intervention that has been found to improve outcomes of many pre-term and low birth weight infants. This is a simple and effective intervention; it requires no extra cost and can be implemented in any part of the world, greatly increasing the possibility for positive outcomes. There is a large amount of research on the topic of kangaroo care and its benefits. This intervention has been found to increase weight gain in low birth weight infants, regulate temperature control, increase cerebral blood flow, increase parental bonding, decrease heart rate, and increase oxygenation of pre-term infants. The research presents that no harmful or adverse effects have occurred to the infants during or after kangaroo care. One study has also shown evidence that kangaroo care can positively impact full-term infants; this includes decreased stress and pain perception along with several other things. More research must be done in regards to full-term infants to support the implementation of kangaroo care in this population. With no adverse effects found I would suggest implementing kangaroo care in all infants, including full-term infants, to provide the opportunity for the strong possibility of positive outcomes. This review of literature provides evidence of the benefits of kangaroo care, seeks to increase its implementation, and make it part of standardized care in all stable infants.



Student: Theresa Umscheid
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: The Zinc Link to Cancer

115

Abstract:

The purpose of this research is to determine if the utilization of a zinc treatment will prevent, slow, or even cease cancer cell growth. Many studies have found patients with various forms of cancer to be zinc-deficient. Research shows that adequate daily intake of zinc may help prevent cancer, in the same way smoking cessation and daily exercise reduce the risk for cancer. Zinc could potentially be used in the making of new chemotherapy drugs so as to obtain treatment that kills cancerous tissues, without harming normal, healthy cells. This would also suggest that it is possible to have a chemotherapy regimen without harmful side effects such as mucositis, nausea, vomiting, hair loss, and weight loss. This research will allow nursing professionals to educate patients on treatment options and health promotion techniques. Together, the healthcare team will improve health literacy among all patients, both healthy, and acutely ill.



Student: Emma Vogel
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Placentophagia: Is it Nutritious?

116

Abstract:

Placentophagia is the act of eating ones placenta. One can do this by eating it raw, cooked, or encapsulated. Eating ones placenta has become a practice with middle class white American women and is becoming more popular with younger generations. It is thought that by eating the placenta one may experience pain relief, an increase in milk production, decrease of postpartum depression, improved mood, increase in energy, and prevention of hemorrhage. It is also believed that consuming the placenta will replace nutrients and hormones such as iron, vitamins B12 and B6, estrogen, fats, protein, and folate acid. The literature review revealed a lack of evidence to support that any of these benefits actually occur after eating a placenta. Some research reported that eating the placenta could be harmful, due to it being an intrauterine barrier. The placenta is not sterile and could be harboring harmful chemicals and diseases such as mercury, lead, peptides, steroids, and sexually transmitted infections. More research is needed to determine the potential effects that placentophagia can have on postpartum women.



Student: Long Xiao
Student Status: Undergraduate
Major: Political Science
Advisor: Dr. Kayce Mobley
Title: Looking to the Past, For Future: Implications and Connections Between Confucianism, Constructivism and the Rise of China

117

Abstract:

This study will introduce the central thoughts of the Chinese historic international relations school of Confucianism, analyze its overlaps with the Political Science theory of Constructivism, and its implications to the current rise of China. Upon examination of the Chinese texts, the Analects of Confucius, Thoughts of World Leadership, and Implications by Xuetong Yan, as well as, the landmark works of modern Constructivism, a significant amount of commonalities between the two influential schools of thinking was found present. Such similarities rest in three propositions: the focus on individualistic cultivation, the use of norms, and the shaping of identities. This study will then explore the consistency between the recent domestic and foreign policies of Beijing and Confucianism, which can be spotted in recent news: China's ubiquitous aristocratic selection on public officials, Chinese continuous interests on establishment of Confucius Institute worldwide, and its increasing participation in the World Trade Organization. This article will also analyze Beijing's recent ingratiating arrangements during the U.S. President Trump's visit to China, arguing that such measures signal a strong desire to pursue peaceful relationship from Beijing. The research concludes that the confirmation of Chinese Confucian ideologies on foreign policies will induce China to undergo a journey of peaceful diplomatic strategies in future foreign policy events. A comparative study, literature review and current event analysis were the three major methodologies that were employed in this study. This study offers a new way of interpreting the Chinese global efforts and addresses the future images of Sino-America relations.



Student: Mariah Zerr
Student Status: Undergraduate
Major: Nursing
Advisor: Dr. Barbara McClaskey
Title: Mirror Therapy in Stroke Patients

Abstract:

The purpose of this research project is to evaluate the effectiveness of incorporating mirror therapy into the rehabilitation program for stroke patients with unilateral weakness or paralysis. Patients who have suffered a stroke can be affected by a multitude of conditions including physical, emotional and cognitive impairments. Motor coordination and paralysis are some of the possible physical impairments a stroke can cause that may have a profound effect on the ability of a person to perform activities of daily living such as walking and eating. The recovery process for stroke patients includes physical and occupational therapy to attempt to restore as much function as possible. In this project, I researched mirror therapy as an additional form of therapy for patients with physical disabilities after a stroke that can be added to the rehabilitation plan. The intent of this therapy is to help restore neural connections in the brain that facilitate muscle movement. These studies concluded that implementation of mirror therapy has positive outcomes for patients ranging from restored motor function to improved self-image.



Student: Laura Anderson

Student Status: High School

High School: Joplin High School

Advisor: Mrs. Karisa Boyer

Title: Effects of Soil Nitrogen Levels on Action Potential Duration of *Dionaea Muscipula*

119

Abstract:

When the trap of *Dionaea muscipula* snaps closed, it releases an action potential. This action potential is an electrical signal that travels from the lobe of the trap to the midrib. Venus flytraps are known for their tendencies to trap and eat flies and other small insects. The plants do this in order to gain nitrogen, because the soil nitrogen levels in their environment are very low. The purpose of this experiment was to test how soil nitrogen levels impact the strength of the action potential released. I had two testing groups, one with rich soil nitrogen levels and one with deficient nitrogen levels. The concentrations of nitrogen were measured on a scale from N0 to N4, with N0 being a depleted amount of nitrogen and N4 being a surplus of nitrogen. Since Venus flytraps thrive in an environment where soil nitrogen levels are low, the control group had depleted nitrogen levels. The nitrogen was stripped from the soil using peat moss, and was added to the soil using fertilizer. After the soil nitrogen levels reached a point where they continued to be steady, the action potentials of each plant were measured using an electrophysiology device. I hypothesized that the plants with lower soil nitrogen levels would have stronger action potentials.



Student: Ashley Blumenthal

Student Status: High School

High School: Park Hill High School

Advisor: Mrs. Sara Capra

Title: The Role of Bereavement on Short-term and Long-term Subjective Well-Being

120

Abstract:

The aim of this study was to understand how the loss of a parent during adolescent years, age thirteen to nineteen, affected a person's subjective well-being throughout different periods of their lives. The loss of a parent has been previously linked to a myriad of negative emotions that are associated with the grieving process and life after the loss. The eight participants (four current adults and four current teenagers) in this study responded to a multitude of questions designed to examine their subjective well-being before, during, and after the processing of their loss. While responses differed, many trends were found among them. All reported that they had felt numb-like or that they did not initially want to deal with the emotions they were feeling. Later reporting they had to accept and process the emotions they were feeling. All participants reported that after they had begun to process their emotions, they had experienced a time of depression, anxiety, or sadness. All four adults responded that the loss, no matter how long ago it occurred, still can cause them emotional grievances. The teenagers of this study were not evaluated on this factor, considering their loss is more recent. The adults of this study also credited the loss of a parent to their ability to create a strong, cohesive family unit since they understand what it is like to live without a parent. Emphasizing the importance there is in allowing a person to process their own emotions, on their own time line.



Student: Keaton Campbell
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: The Impact of Shared Characteristics on Empathy Towards Perpetrators

121

Abstract:

The selection of the jury is arguably one of the most important aspects of any trial by jury. It is one of the many elements that can impact the likelihood of a defendant being convicted. The purpose of this experiment was to determine if current jury selection strategies will be effective in the future juror selections of current high school aged people. In this experiment, randomly selected high school students were given two surveys to complete: a personal inventory and an empathy test. The results of these tests were compared in order to determine if more shared characteristics contributed to a more empathetic response. I hypothesized that despite the current societal push for tolerance and acceptance, students would be more likely to feel empathy for those who share the greatest number of similarities with them, therefore giving them a lesser punishment. The results did not support the hypothesis in showing that there was little to no connection between shared characteristics and empathy.



Student: Cassandra Chandler
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: Effect of Organic and Processed Foods on *Coenobita Clypeatus*

122

Abstract:

In the United States alone, there are over 50,000 fast food chains that sell mostly processed, unhealthy food choices (Palo Alto Medical Foundation, 2013). More than 1 in 3 adults are considered to be overweight, which can be caused by eating processed foods (Ogden, 2017). In this study, hermit crabs were used to demonstrate the difference between consuming organic foods and processed foods. It was hypothesized that if fed processed foods, then the *Coenobita clypeatus* would display a lighter, sickly color indicating they were unhealthy. Using a color chart, the colors were measured to indicate which crabs were healthiest. This chart used a scale of one to five, one being almost white, which is the lightest, and five being a deep red/purple color, which is the healthiest (*Coenobita clypeatus*, 2017). It was found that the average color for the hermit crabs that ate organic food was 4.07, while the crabs that were fed processed foods averaged at a color of 3.4. This indicated that the organic crabs were healthier than the crabs that were fed processed foods.



Student: Jackson Elder
Student Status: High School
High School: Park Hill High School
Advisor: Mrs. Sara Capra
Title: Learning and Loot

123

Abstract:

The No Child Left Behind (NCLB) program, initially put in place under President Bush in 2001, was repealed in 2015. The program had its advocates and critics, but the full repeal of the system changed the very foundation for schooling in the United States. Questions arose nationwide about how to deal with the shift from one system to another, and what to do with the scraps left behind by NCLB. Teachers and administrators had major concerns about how their schools would be funded in the future and what the new role of initiatives like standardized tests would be in their schools. No in-depth research had been done on what the post-NCLB era of education brought to these schools. To contribute to this research, a case study of nine high schools in the KC Metro Area was conducted to evaluate key principles of academic achievement and the funding flowing into the school in order to determine any correlations in the population. Schools were asked to provide information about populations of their senior classes when it came to grade-point average (GPA) and standardized test scores on a common subject area. In evaluating the data from the before-mentioned schools, data found that schools who have higher rates of federal spending percentage and federal spending per pupil struggled the most with test scores and GPA measurements. The findings show that high schools in which have lower income levels rely more on federal and state contributions and struggle more with higher GPAs and test scores.



Student: Riley Fitzmorris
Student Status: High School
High School: Park Hill High School
Advisor: Mrs. Sara Capra
Title: The Fourth Wave of Feminism

124

Abstract:

The history of feminism in America is described as a series of waves. The first wave began in the 1920's and focused on suffrage; the second began in the 1960's and focused on labor and autonomy rights; the third began in the 1990's and focused on the inclusivity of minorities and males. The fourth wave is the newest, beginning in the late 2000's. Its definition, however, is still unknown. There are a few theories looking at different perspectives, but overall they are very scattered and there is yet to be a solidified definition. The purpose of this research is to solidify and define the fourth wave of feminism by asking the people who shape the definition: the feminist organizations and the people within the movements. I surveyed modern feminist organizations and asked them about their organization's focus, as well as how that relates to modern day feminism and the fourth wave. Looking at their responses as well as past waves, there are two major differences in the fourth wave of feminism. First, the focus of the movement has become more individualized. Second, the type of communication within the movement has relied heavily on social media as its primary platform. Additionally, the fourth wave seems to mimic the third wave in that the focus is not on the movement itself, but on the communication of the message and a focus on the younger generation.



Student: Lauren Fogarty
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: Effect of Olive Leaf and Grapefruit Seed Extracts on Four Species of Beneficial Intestinal Bacteria

125

Abstract:

Natural alternatives to antibiotics are increasingly being used due to the rise in antibiotic resistance. Two of these commonly used alternatives are grapefruit seed extract and olive leaf extract, as previous research has suggested that both have strong antibacterial properties against multiple pathogenic bacterial species (Liu, 2017; Reagor, 2002). However, little study has been conducted to determine the effect of these natural alternatives on beneficial bacteria found in the digestive tract once ingested. Using a disc diffusion assay, both extracts were tested on four species of gut bacteria: *Lactobacillus acidophilus*, *Escherichia coli*, *Bifidobacterium animalis* subsp. *Lactis*, and *Fusobacterium nucleatum* subsp. *polymorphum*. It was hypothesized that there would be inhibited growth of each species when treated with the extracts, and that there would be larger zones of inhibition when grapefruit seed extract was used with all four species. Results from *E. coli* and *F. nucleatum* subsp. *polymorphum* supported the hypotheses, but *L. acidophilus* had greater zones of inhibition with olive leaf extract. *B. animalis* subsp. *Lactis* had no inhibited growth from olive leaf extract.



Student: Casie Geddry
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: Examining Antibacterial Effect of Instant Coffee vs Medium Ground Coffee on *Escherichia Coli*

126

Abstract:

In the experiment, *Escherichia coli* was used due to previous studies of caffeine having an antibacterial effect on this bacteria. Instead of caffeine, I tested the effects of two types of coffee (both medium ground and instant) from the same brand and same roast on *Escherichia coli* to see if drinking coffee is an antibacterial agent that combats *Escherichia coli* in the gut. After an examination period of seven days, there were no zones of inhibition, meaning there was no antibacterial effect caused by the caffeine.



Student: Noah Harris
Student Status: High School
High School: Park Hill High School
Advisor: Mrs. Sara Capra
Title: Lowering the Minimum Legal Drinking Age

127

Abstract:

Underage alcohol consumption is a problem that plagues not only the United States, but countries all over the world. This problem can cause not only impaired decision making, risky behaviors, and an increased risk for substance-abuse disorders, but it can even cause death. It often actually does, with more than 4,000 deaths for people under 21 years of age. Because of this, many countries have adopted a Minimum Legal Drinking Age of 18. It is unclear whether or not a policy of this nature would curb alcohol consumption rates in a similar way in the United States. This study looks into the effects that a lowered Minimum Legal Drinking Age would have on 16-18 year olds, especially in terms of consumption rates and the negative effects that would occur with increased consumption rates. This study concludes that consumption rates for 16-18 year olds would increase with a decreased Minimum Legal Drinking Age, due mostly in part to an increase in accessibility.



Student: Savannah Huff
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: Neutralizing Free Radical Peroxynitrite Using Antioxidants

128

Abstract:

Produced by traumatic brain injuries such as concussions, free radicals cause many problems when released in the brain including memory loss, attention problems, depression, and disorientation (Allan, 2007). Free radicals are missing an electron, and are unstable. Because of this, free radicals involved in concussions take an electron from brain cell membranes, causing them to die (Dröge, 2002). To prevent these long term issues, free radicals need to be eliminated by using antioxidants. Antioxidants can stop the effects of the free radicals if they are administered within 30 minutes (Chamelian, Reis, & Feinstein, 2004). I hypothesized that if antioxidants Vitamin D3, Lipoic acid, and Glutathione are separately added to a mixture of Peroxynitrite, Arachidonic acid, and Phosphate Buffered Saline, then Lipoic acid will work best to eliminate free radicals. A Malondialdehyde test kit was used to determine the amount of the free radical that was left after it had time to exchange an electron with the designated antioxidant. Although all of the antioxidants I chose made a difference in the amount of free radical damage to the simulated brain cell, Lipoic acid was considerably better at neutralizing free radical Peroxynitrite than Glutathione and Vitamin D3.



Student: Megan Hyatt

Student Status: High School

Group Members: Sanket Bhojate, Madhav Ghimire, Pawan Kahol, Sanjay Mishra, Tucker Morey, Charith Ranaweera, and Chunyang Zhang

High School: Labette County High School

Advisor: Dr. Ram Gupta

Title: Eco-Friendly and High Performance Supercapacitors for Elevated Temperature Applications Using Recycled Tea Leaves

Abstract:

Used tea leaves are utilized for preparation of carbon with the high surface area and electrochemical properties. Surface area and pore size of tea leaves derived carbon are controlled by varying the amount of KOH as the activating agent. The maximum surface area of 2532 m²/g is observed, which is much higher than unactivated tea leaves (3.6 m²/g). It is observed that the size of the electrolyte ions has a profound effect on the energy storage capacity. The maximum specific capacitance of 292 F/g is observed in 3 M KOH electrolyte with outstanding cyclic stability, while the lowest specific capacitance of 246 F/g is obtained in 3 M LiOH electrolyte at 2 mV/s. The tea leaves derived electrode shows almost 100% capacitance retention up to 5000 cycles of study. The symmetrical supercapacitor device shows a maximum specific capacitance of 0.64 F/cm² at 1 mA/cm² and about 95% of specific capacitance is retained after increasing current density to 12 mA/cm², confirming the high rate stability of the device. An improvement over 35% in the charge storage capacity is seen when increasing device temperature from 10 to 80 °C. The study suggests that used tea leaves can be used for the fabrication of environment-friendly high-performance supercapacitor devices at a low cost.



Student: Mollie Judd

Student Status: High School

High School: Prairie View High School

Advisor: Mrs. Christy Nickelson

Title: Improving the Criteria for Judging Various Breeds of Rabbits Improves the Quality of Breeds

Abstract:

There are forty-nine breeds of rabbits that have been sanctioned by the American Rabbit Breeders Association. When showing a rabbit, a judge looks at the general body type, fur or wool, color and markings, and condition. With each breed, one of these categories is worth more points in the Standard of Perfection. The Standard of Perfection is the guide to competitive breeders on how to raise show quality rabbits and how those rabbits will be scored. Many breeders become discouraged because their rabbits of certain breeds are not performing well on the show table. The purpose of my research is to prove that if judged differently, some breeds of rabbits would do better on the show table. Methods of research include interviewing over twenty-five judges and many breeders and analyzing the Standard of Perfection guide. My research will show that judges and breeders alike tend to avoid certain breeds of rabbits because of how they are judged. Therefore, I have concluded that a change in the Standard of Perfection is necessary to improve the criteria of judging, and thus improve the quality of each breed of rabbit.



Student: Rebecca Kerr
Student Status: High School
High School: Prairie View High School
Advisor: Mrs. Christy Nickelson
Title: Teaching Kids that Science is Fun with Constellations

131

Abstract:

"Wish upon a shooting star, oh how I wonder what you are," goes the childhood rhyme. Do we really know what stars are? We learn these nursery rhymes at a young age often without stopping to look up at the night sky and actually wonder "what you are." Do these stars have a name? How far away are they? As little kids, we never get that true experience of learning what the stars are. My purpose is to increase children's knowledge and enthusiasm about the stars and constellations. I want children to look up at the night sky and be excited to tell their parents, "that's the big dipper" or "hey, that's cancer and that's Orion's belt." To test my theory of increasing the interest in science, I will take a simple craft and turn it into an adventure of space for kindergarten, first, and second-grade students. After completing the lesson and craft, students will complete an oral survey so that I may evaluate their interest. I will also follow up with a discussion with teachers and parents to note the increased interest. The end result should be that the kids would want to learn more about the stars and the constellations that we see above us so they can "wish upon a shooting star" and know exactly what they are.



Student: Silvester Lorencík
Student Status: High School
High School: Prairie View High School
Advisor: Mrs. Christy Nickelson
Title: The Importance of Foreign Languages and the Lack of Language Focus in the United States

132

Abstract:

As English has become more predominant throughout the world, learning a foreign language has become seemingly useless. However, learning a foreign language opens a world full of opportunities. Whether it is increasing job opportunities, traveling, or getting to know new cultures, learning a new language is always extremely useful. Language learners can gain new information and new perspectives on their own culture as they learn about foreign cultures. The education of the United States lacks language classes, even though the labor market today demands more and more people who speak a foreign tongue. In comparing the focus on foreign languages in the education of the US and the EU, European students outlearn the students of the United States when it comes to languages. The direct purpose of my research is to convince American society that learning a foreign language is not useless. The methods I have used to prove the importance of learning a foreign language include internet sources, which compare the education of students in the United States and in the European Union, and teacher interviews. Findings show that learning a foreign language not only helps one understand foreign cultures, but also helps the development of one's brain.



Student: Amber Manning
Student Status: High School
High School: Prairie View High School
Advisor: Mrs. Christy Nickelson
Title: The Connection Between Religion and Happiness

133

Abstract:

Happiness is an emotional state that every human being strives for. With the recent rise in suicides and depression, one might wonder, what is the way to achieve true happiness? Some people believe happiness is having a large sum of money, being successful, or reaching your goals. However, some qualities that supposedly make people happy are not long lasting, so the question that should be asked is, "what brings true long lasting happiness?" There is evidence that having religious faith contributes to being happy. Faith gives people a hope for the future, a purpose in life, and a social group. My research project will prove that happiness is more evident in people who profess to have religious beliefs. My research will include interviews of an Agnostic, Atheist, and someone with a religious faith. In addition, the Bible and other religious books will be used to prove that having a religious faith brings happiness. With faith and the values accompanying that faith, my research shows that people are more apt to proclaim their happiness.



Student: Brooks Neria
Student Status: High School
Group Members: Sanket Bhoyate, M. Ghimire, M. Hyatt, P. K. Kahol, S.R. Mishra, Felio Perez, and C. Zhang
High School: Carl Junction High School
Advisor: Dr. Ram Gupta
Title: Nitrogen-Doped Flexible Carbon Cloth for Durable Metal Free Electrocatalyst for Overall Water Splitting

134

Abstract:

Water electrolysis is one of the greenest ways to generate clean energy. However, it is critical to develop durable and cost-effective electrocatalysts using earth-abundant materials for overall water splitting. Here we report, a facile method to fabricate N-doped cotton cloth as an electrocatalyst. The N-doped cotton cloth showed outstanding performance as an electrocatalyst for overall water splitting. For oxygen evolution reaction (OER), N-doped cotton cloth requires a low overpotential of 351 mV to deliver 10 mA/cm² of current density with a Tafel slope of 88 mV/dec. On the other hand, it requires 233 mV to achieve a current density of 10 mA/cm² for hydrogen evolution reaction (HER) with a Tafel slope of 135 mV/dec. Furthermore, the electrocatalyst showed outstanding electrocatalytic stability and flexibility. The observed overpotential and stability are among the best for the metal-free electrocatalyst. Such a binder-free approach for fabrication of high performance, durable and flexible bi-functional electrocatalyst could be a promising way to generate green energy from water.



Student: Samuel Peterson
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: The Effect of Diet on Murine Vaginal Microbiota

135

Abstract:

This experiment investigated the effect of diet on the vaginal bacteria of mice with the intent of extending that understanding to humans. I hypothesized that if I used three different nutrients (fiber, simple sugars, proteins) and tested for their effect on murine (mouse) vaginal microbiota, then the sugar would result in greatest growth of bacteria across all groups tested. Groups of 10 mice were each given a different diet over a period of two weeks consisting of additional fiber, sugar, protein or no additional supplements. Vaginal samples were collected and spread on agar. Once the cultures had developed, the agar was analyzed for bacterial content. The specific bacterial genera analyzed were Gardnerella and Lactobacillus along with overall growth. Overall growth was roughly similar for the control, fiber and sugar groups, but different for protein in a statistically significant manner ($p < 0.05$). Measurements of Lactobacilli growth were inconclusive and unusable. Growth of Gardnerella was strongest with fiber with the other experimental groups roughly consistent with the control and was statistically significant ($p < 0.05$).



Student: Josie Phillips
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: The Environmental Effect on Cognitive Ability in Cichlasoma Synspilum X Cichlasoma Citrinellum

136

Abstract:

Does the bare bottom tank keep the Cichlasoma synpilum X Cichlasoma citrinellum (parrotfish) stress low or does it cause more stress to them since they have nowhere to hide? This experiment is based on a simple argument that has been coming up in marine biology. Professionals have asked whether a bare bottom tank stresses out fish more than having them in a structured environment. My experiment shows whether the structured or unstructured environment will affect Cichlasoma synpilum X Cichlasoma citrinellum memory when they are put in a maze. During seven trials of every fish going through the maze, the data was collected and put into a spreadsheet. The last trial's time was subtracted from the first and then the all the differences from that group was averaged. This average showed if they improved their time or if they took longer. This study shows that the fish in the bare-bottom tanks had improved times more on average from the first to last trials, while the control group's times got, on average, 135 seconds slower.



Student: Veda Reinhardt
Student Status: High School
High School: Prairie View High School
Advisor: Mrs. Christy Nickelson
Title: United States vs The World: Gun Control

137

Abstract:

There is plenty of evidence that proves that the United States' gun control methods are subpar compared to other countries in the world, and frankly, our country could gain a great deal from considering these other practices. The purpose of my research is to analyze the ongoing debate of whether or not to prohibit guns entirely or to make more harsh laws and regulations. Americans own more guns per capita than any other country in the world which also makes the U.S. one of the top countries for gun violence (excluding war-ridden countries). If new, more reliable laws were to be put into place, perhaps there would be a significant decrease in the amount of gun violence in America. However, taking firearms away entirely could show to be more effective in decreasing gun violence. My research indicates that both tactics could eventually prove to be beneficial for not only our country, but for others around the world as well. By looking at how foreign leaders and governments address the issues arising from gun violence, the U.S. could very quickly devise a solution to this ever-growing problem of gun violence. If any form of change, by means of gun laws, were to be enacted towards civilians, there would be both benefits and detriments to whomever these new laws affect.



Student: Johnathan Reynolds
Student Status: High School
Group Member: Dalton Sylva
High School: Prairie View High School
Advisor: Mrs. Christy Nickelson
Title: The Superior Linux Desktop Environment for New Users

138

Abstract:

As the number of Linux users are increasing from other platforms, there arises an issue of the Linux system being easy to navigate. Many Linux users have found a plethora of desktop environments or graphical shells that display what the Linux system is processing but do not know how to use them. The question arises, which desktop environment should a user pick? The purpose of our research is to find the best desktop environment for new Linux users. Our research will include seven different desktop environments on the Linux Mint Distribution. Each one will present a different user interface. The results will be evaluated for simplicity, user-friendliness, graphic appeal, customization level, and how easily an old and a new computer can run the environment. Our results will identify the superior desktop environment for new Linux users.



Student: Alexandria Ried
Student Status: High School
High School: Prairie View High School
Advisor: Mrs. Christy Nickelson
Title: How Wireless Technology Can Cause Autism and Other Health Risks

139

Abstract:

Wireless technology such as cell phones, smart watches, wireless routers, and Bluetooth technology is used on an everyday basis due to modern technological advances. All wireless technology is operated using frequencies called Electromagnetic Radiation, (EMR), otherwise known as radio waves. Radio waves are electromagnetic waves that send and receive data from wireless technology to cell phone towers. These frequencies range between FM radio and microwave frequencies. Surprisingly, many people are unaware that EMR may cause developmental health risks including Autism. Radio waves may inhibit brain development in young children. According to AutismSpeaks.org, as regular microwave RF exposure rises, Autism also rises, following almost exactly the same trend. This trend shows an unmistakable correlation between the rise in Autistic spectrum disorders, and the exposure to wireless technology. My research shows that there is not only a direct correlation between the rise in the use of wireless technology and Autism, but perhaps that radio waves pose other dangerous health risks. My research concludes that there is a necessity for further research on electromagnetic radiation emitted by wireless technology and that there are possible dangers which can impact the rise in Autism and other health risks.



Student: Jona Roberts
Student Status: High School
High School: Park Hill High School
Advisor: Mrs. Sara Capra
Title: Family Life and Gender Identity

140

Abstract:

The main goal of this study is to raise awareness of LGBTQ+ people and the lives they live because of how they present themselves to society. The purpose is to identify the key factors that lead to someone discerning a gender for themselves and find factors in adolescent development that evolve into someone defining their gender. The 12 participants in this study range from 16-19 years old and are in high school or their first year of college. These individuals vary on the Gender Spectrum and represent African American, White, and Mexican ethnicities. The essential method of collecting data for this study was through a free-response survey of 23 questions sent out via email to all participants. Though answers varied greatly, a trend occurred in that most participants who identified differently from male or female were able to recall a single time when their gender identity isolated them from peers and family. Many of these individuals have been misnamed and/or misgendered daily. Many of the participants who recalled these feelings of rejection also showed signs of mental health problems such as dysphoria, depression, anger issues and extreme anxiety. The research indicates that it's not just in the presentation of identity but in the acceptance of identity that impacts the mental health of the individual.



Student: Hannah Scott
Student Status: High School
High School: Park Hill High School
Advisor: Mrs. Sara Capra
Title: Sexualization in Advertising

141

Abstract:

Everyday we are exposed to sexualized imagery within advertisements. While most agree that the advertising we are exposed to everyday must have some effect on the way many view themselves or others, few have tried to view the effects on the younger generation singularly. I found an interest in the idea that individuals at one of the most important phases of life developmentally, must retain something from the stimuli they are exposed to everyday. This study specifically focuses on the effect sexualized advertising may have on young adolescents between the middle school grades of 7th and 8th. This study employs the method of phenomenological research in an interview format. Thirty nine male and female students ranging from the grades of 7th and 8th were all given the same information and instructions, and then shown the same advertisements. All participants were asked the same questions in response to the viewing of the images. Through this format of study, it was found that each gender had markedly different responses to the photos, and what gender they were looking at did have an effect on the words and emotions they provided. It was also seen that many felt more comfortable comparing others to those seen in advertisements, than themselves. This study concluded that the effects of advertising on young adolescents lie largely in the unrealistic standards they set, as well as that gender may be one of the leading factors in deciding just how much a young adolescent is affected by sexualized advertisements.



Student: Carly Short
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: The Effects of Ammonium Nitrate on Brassica Rapa Growth in Stem and Roots

142

Abstract:

How do nitrogen levels impact the growth and health of plants? If there is more nitrogen present while growing Brassica rapa, then the stem height, root length, and overall mass will be reduced when compared to plants with lower nitrogen levels. Ammonium nitrate is used as a high nitrogen fertilizer and can cause a lower growth rate and less plant production (Liu, 2017). When high nitrogen levels are present, plants can appear greener and more vibrant, but actually have a diminished root growth rate leading to plant death ("Nitrogen", 2017). After a growing period of two weeks, the heights of the stems were measured (cm), the length of the roots were measured (cm), and the mass of the entire uprooted plant was taken (g).



Student: Savana Smith
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer

143

Title: The Effect of Different Antibiotic Treatments on Urinary Tract Infections Linked to Escherichia Coli

Abstract:

Urinary tract infections caused by bacteria entering the urinary tract, are responsible for ten million doctor visits each year (National Kidney Foundation, 2010). Antibiotics are typically used to treat this infection. This experiment was performed using multiple antibiotics to see which one effectively killed the most Escherichia coli (E. coli) bacteria which is linked to the cause of urinary tract infections. It was hypothesized that if E. coli bacteria came in contact with the antibiotics ciprofloxacin, fosfomycin, levofloxacin, and nitrofurantoin, then levofloxacin would kill the most bacteria due to its ability to prevent the bacteria from multiplying. Agar plates were swabbed with E. coli and the bacteria grew in the presence of the four different antibiotics. The zones of inhibition were measured for each antibiotic. Results indicated that levofloxacin inhibited the most bacteria growth. The results were statistically significant.



Student: Phoebe Watson
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer

144

Title: Effect of Herbal Treatments on Staphylococcus aureus subsp. aureus, Staphylococcus epidermidis, and Malassezia globosa in Atopic Dermatitis

Abstract:

Due to bacterial resistance to oral and topical steroids, there is a need for an herbal supplement and a fast treatment of the bacteria that cause the symptoms in atopic dermatitis (AD), commonly known as eczema. Currently, there are no widely known alternatives to harsh topical steroids and oral steroids currently used to treat AD (Kim, 2017). This experiment used the agar disc diffusion method and tested the ability of four different herbal treatments: German chamomile essential oil, oregano essential oil, thyme essential oil, and apple cider vinegar to inhibit the growth of Staphylococcus aureus subsp. aureus, Staphylococcus epidermidis, and Malassezia globosa. I hypothesized that if I treated the two Staphylococcus bacteria with the four essential oils, then oregano essential oil would inhibit the most growth, while in Malassezia globosa, the treatment that inhibited the most growth would be apple cider vinegar. All treatments were diluted at a 1:10 solution in autoclaved coconut oil. Results indicated that the most effective treatment on Staphylococcus aureus subsp. aureus was thyme essential oil, whereas the results indicated the most effective treatment on Staphylococcus epidermidis and Malassezia globosa was oregano essential oil.



Student: Sofonyas Woldekidan
Student Status: High School
High School: Park Hill High School
Advisor: Mrs. Sara Capra
Title: Fully Reusable Launch System

145

Abstract:

This research was conducted in order to create a 2-D model of a fully reusable launch system. The system was made to use old systems' modes of recovery and concepts in order to recover each stage of a three stage launch system. The paper tries to recover each stage of the rocket using as little retro-propulsion as possible, as that method adds a lot of extra weight through fuel and additional devices. The paper compares two methods (or modes) of recovery for each stage of the rocket using their added extra weight, extra fuel needed, their simplicity and their ability to be integrated with the other two stages. After the comparison was completed, every stage, except for the second stage, had one clear method of recovery. The paper found that the ADELIN (Airbus) method of recovery would fit the first stage best, and the NASA splashdown recovery would be the best for the third stage. The second stage however was a little more difficult to recover. Half of the second stage (the lower fuel tank) was decided to be recovered using the ULA's HIAD method, while the side boosters would be recovered as gliders through the ROSCOSMOS Energia 2 method. The top fuel tank which was decided to be recovered using the JAXA style/ method of retro-propulsion.



Student: Taylor Yuhas
Student Status: High School
High School: Joplin High School
Advisor: Mrs. Karisa Boyer
Title: Effect of Artificial Sweeteners on *Daphnia magna* Survival Rate and Heart Rate

146

Abstract:

Sugar has been known to cause health concerns such as obesity and diabetes which can wreak havoc on heart health (Brown, 2010). To avoid these diseases, many Americans try to lower caloric intake by substituting artificial sweeteners in food and drinks as an alternative to sugar (Sylvestsky, 2012). *Daphnia magna* were used to help determine the effects of the universal additives, sucralose and aspartame, on survival rate and heart rate. Past research has shown that high levels of aspartame and sucralose ingested can have negative effects on the human body (Schliedt, 2009). Therefore, high concentrations were used on the *Daphnia magna*. It was hypothesized that if *Daphnia magna* were exposed to high concentrations of aspartame and sucralose, then the aspartame would negatively affect the survival rate and heart rate of the *Daphnia magna* more than sucralose, due to the greater amount of harmful effects. Acute testing was used to determine the toxicity levels that the artificial sweeteners had on the *Daphnia magna*. Results showed that as aspartame and sucralose concentrations increased, the heart rate did as well. The results also showed that there was no strong correlation between the two artificial sweeteners and the survival rate of the *Daphnia magna*.



Student: Cody Lindbloom

Student Status: Graduate

Group Members: Serena Hoffman, Emily Loethen, Joshua Schooley, and Megan VanWey

Major: Psychology

Advisor: Dr. Jamie Wood

Title: Gender and Ethnic Diversity Among College Students with ADHD Affect Faculty Perceptions and Willingness to Provide Accommodations

Abstract:

To determine if the ethnicity and gender of college students with ADHD would affect instructors' willingness to offer the students accommodations, surveys were sent to all full-time instructors at nine universities and colleges in the Midwest. Two hundred eighty instructors completed the 12-item survey, which had them read one of ten vignettes of a fictional student and a hypothetical situation that had occurred in a campus classroom. In the vignettes, the ethnicity (five categories) and the gender of the student varied. Additional questions inquired about instructor teaching experience and gender. Findings from ANOVA and appropriate post-hoc tests confirmed that gender and ethnicity of the portrayed student affected instructors' willingness to provide certain accommodations. Some of these effects interacted with the instructor demographic variables. Main effects along with interactions are discussed along with the implications of the findings and guidelines for future research.



Index

Nawaf Albeladi.....	p.26
Ahlam Alghamdi	p. 6, 55
Ghazwan Alshammari.....	p. 26
Mohammed Alshammari	p. 27
May Altammar	p. 27, 55
Laura Anderson	p. 69
Michael Barnes	p. 6
Ren Bean.....	p. 7
Sanket Bhoyate.....	p. 7, 28, 56
Ashley Blumenthal.....	p. 69
Jordyn Bollinger.....	p. 13
Matt Bonner	p. 16
Wesley Brantley.....	p. 36
Brandy Brouhard.....	p. 37
Sirena Bruner.....	p. 48
Harley Burch.....	p. 37
Evan Burke.....	p. 17
James Burlingame	p. 10
Nicholas Burnett.....	p. 38
Amanda Bustamante	p. 17
Kimberly Byler.....	p. 28
Keaton Campbell	p. 70
Kylie Carnahan	p. 38
Cassandra Chandler	p. 70
Andrew Chesney	p. 39
Avery Coronado	p. 11
Willie Cowley	p. 53
Jasmine Crame.....	p. 49
James Daniel	p. 29
Saloni Darji	p. 29
Chelsey Davenport	p. 18
Rece Dawson	p. 18
Lelan DeLissa	p. 39
Bailee Deviney.....	p. 58
Emily Dickey	p. 58
Ashleigh Elbert.....	p. 30
Jackson Elder.....	p. 71
Rebekah Elliott	p. 40
Max Ernst.....	p. 49, 50
Riley Fitzmorris.....	p. 71
Bailey Flora	p. 59
Lynzee Flores.....	p. 14

Lauren Fogarty	p. 72
Abby Ford	p. 59
Casie Geddry	p. 72
Jenna Gilstrap.....	p. 60
Tara Gire.....	p. 18
Robin Goodreau	p. 40
Christopher Griffetts.....	p. 53
Gabriela Gumucio	p. 11
Noah Harris.....	p. 73
Thomas Hext	p. 19
John Hey.....	p. 41
David Hollie.....	p. 8
Brenna Hoppes	p. 50
Joshua Horton	p. 15
Blake Hudson	p. 51
Savannah Huff.....	p. 73
Katie Jo Hull.....	p. 60
Megan Hyatt.....	p. 74
Christen Ireland.....	p. 53
Vedant Jain	p. 42
Michaela Joines	p. 15
Hannah Jones.....	p. 61
Mollie Judd.....	p. 74
Rebecca Kerr	p. 75
Ming Wie Khoo.....	p. 19
Grady Lenihan	p. 61
Cody Lindbloom.....	p. 83
Silvester Lorencik	p. 75
Lucy Lotspeich	p. 30, 47
Kelly Mallatt	p. 42
Amber Manning	p. 76
Kayla McCollough	p. 23
Katie McMurry.....	p. 8
Kevin McNay	p. 31
Kaustubh Mhatre	p. 31
Brett Miller	p. 20
Amy Mitrisin	p. 51
Laura Moldazhanova.....	p. 47
Lewis Moore	p. 12
Tucker Morey	p. 43
Abigail Morgan	p. 44
Camila Muliterno Zequine	p. 32, 56
Eric Mullins	p. 9
Hannah Myers	p. 62
Brooks Neria.....	p. 76

Leslie Nichols.....	p. 62
Elena Olson	p. 32
Zion Opprieht.....	p. 63
Jillian Otter	p. 63
Paula Ovelar Oviedo.....	p. 64
Jose Parlade.....	p. 57
Oleksandra Pashchenko.....	p. 44
Jack Patterson.....	p. 64
Paige Peppard.....	p. 57
Samuel Peterson.....	p. 77
Josie Phillips.....	p. 77
Joao Poli.....	p. 65
Madeline Prachyl.....	p. 51
Levi Qualls	p. 54
Sneha Ramanujam.....	p. 33
Veda Reinhardt.....	p. 78
Johnathan Reynolds.....	p. 78
Alexandria Ried	p. 79
Jona Roberts	p. 79
Nicolas Robinson.....	p. 20
Katelyn Roth.....	p. 22
Sreerupa Sanyal.....	p. 48
Derek Scholes	p. 45
Hannah Scott.....	p. 80
Zachary Shaw.....	p. 9
Carly Short.....	p. 80
Lok Shrestha.....	p. 45
Nathaneil Skinner	p. 12
Kohl Slaughter	p. 65
Savana Smith.....	p. 81
Olivia Stiens.....	p. 52
Jodi Stuhlsatz.....	p. 66
Kelsey Tallent.....	p. 21
MacKenzi Tims.....	p. 16
Tanuja Tummala.....	p. 33
Theresa Umscheid	p. 66
Ryan Urban	p. 52
Emma Vogel.....	p. 67
Ryan Walker	p. 46
Brian Warner	p. 46
Phoebe Watson.....	p. 81
Mark Weaver.....	p. 22
Sofonyas Woldekidan.....	p. 82
Skyler Worley.....	p. 21
Long Xiao	p. 67

Samantha Young Pryer p. 34
Taylor Yuhas p. 82
Mariah Zerr p. 68
Chunyang Zhang p. 10, 34
Chen Zhao p. 35



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