2024

SWOSU Research and Scholarly Activity Fair 2024

SWOSU Office of Sponsored Programs

The 32nd SWOSU Research and Scholarly Activity Fair

April 18, 2024

SWOSU Wellness Center

12:00 p.m. – 3:00 p.m.

32nd Annual
SWOSU Research and Scholarly Activity Fair
Thursday, April 18, 2024

On behalf of the members of the University Research and Scholarly Activity Committee (USRAC) and the Office of Sponsored Programs (OSP) at Southwestern Oklahoma State University (SWOSU) - **Welcome to the Thirty-Second SWOSU Research and Scholarly Activity Fair!** There are **61** poster presentations and **10** oral presentations involving over **100** student and faculty researchers, writers, presenters, artists, collaborators, and faculty sponsors encompassing activities from the SWOSU Departments of Biological Sciences, Chemistry & Physics, Engineering Technology, Kinesiology, Language & Literature, Mathematics, Music, Parks and Recreation Management, Pharmacy, Psychology, and Social Sciences.

We wish to extend special thanks to all who played vital roles in making this event happen, particularly: President Diana Lovell and Provost Joel Kendall, for their continued support of research and scholarly activity at all levels throughout the University; Ms. Susan Ellis, Ms. Radonna Sawatzky, and their staff for helping to set up the facilities and providing refreshments. We also recognize the faculty, staff, and administrative sponsors and collaborators who dedicate significant time and effort toward integrating students into various forms of research and scholarly activity. Also, a special thank you to those who took the time to perform poster evaluations that provides useful and constructive feedback which will help with the professional development of our students.

I personally would like to acknowledge Mr. C.J. Smith, OSP, Ms. Jamie Wilks, OSP, and their team of students for their dedication and hard work to make this event a reality in coordination with the SWOSU University Research and Scholarly Activity Committee.

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

Enjoy the Fair!

Sincerely,

Jon Henrikson

Jon Henrikson, Chair, URSAC

SWOSU URSAC Committee Members

Dr. Jon Henrikson, Department of Chemistry & Physics
Dr. Jieun Chang, Department of Social Sciences
Dr. Jeremy Evert, Department of Business & Computer Science
Dr. Wael Eldahshan, Department of Pharmaceutical Sciences
Mr. CJ Smith, Office of Sponsored Programs
Mr. Frederic Murray, SWOSU Al Harris Library
Dr. Zach Jones, Department of Allied Health Sciences
Dr. Veronica Aguiñaga, Department of Education
Dr. Vijay Somalinga, Department of Biological Sciences
Ms. Jamie Wilks, Office of Sponsored Programs

Things to do during and after the SWOSU Research & Scholarly Activity Fair:

1. ***Share Pictures and Videos***: Please post your photos and videos via social media, and tag them with:

   #SWOSUResearch **#GoDawgs** **@SWOSU**

   And, feel free to send in your photos by emailing them to osp@swosu.edu

2. ***Exit Survey***: Please complete a short, anonymous online survey to provide feedback regarding your experience with the Fair – this will help us to make future events better.

-To access the survey, here: SWOSU Research and Scholarly Activity Fair Exit Survey

Or by scanning the **QR code** to the right:

-We also will email this link to you after the Fair.

3. ***Report and publish your work:*** Check with your mentor about reporting and publishing your poster or oral presentation. Some options include:

   -Completing a **Scholarly Activity & Academic Activity Report** for the office of sponsored programs:

   Scholarly Activity and Academic Activity Report

   -Publishing your work on **Digital Commons** via the SWOSU Libraries **(SWOSU Digital Commons)**

We congratulate you for participating in the Spring 2024 SWOSU Research & Scholarly Activity Fair, and we look forward to seeing you next time!

Name	Poster Number	Title
Alcuitas, Joseph	Poster - 08	Sexual selection in response to varying levels of cultural eutrophication
Alcuitas, Joseph	Poster - 10	The Effect of Female Mate Choice on Offspring Sex Ratios in a Freshwater Amphipod Species
Aluko-Olokun, Ebunoluwa Anuoluwapo "Gigi"	Oral Presentation - 1:45	Body Dismorphic Disorder
Alvarez, Waleri	Poster - 48	Relations of Visual Imagery Ability to Emotions Such as Anxiety and Compassion
Alvarez, Walerie	Poster - 47	Relations of Visual Imagery Ability to Detail Generation and Text Experience of Visually and Auditorily Presented Stories
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Appeddu, Lisa	Poster - 39	Comparisons Between Student Pharmacists and Healthcare Majors on Knowledge and Perceptions on Medical Cannabis
Appeddu, Lisa	Poster - 41	Student Pharmacists' Perceptions on Comfort and Confidence of Dispensing and Counseling Medical Cannabis
Aquino, Adreana	Poster - 02	Crystal Structure of a Reactive Intermediate Deaminase A (RidA) homolog from Streptococcus sanguinis
Bacon, Zander	Poster - 32	Performance Anxiety in Young Professional Musicians
Banderas, Alexis	Oral Presentation - 12:45	Ocean Pollution in America: How It Affects Our World and Our Marine Life
Beam, Bentley	Oral Presentation - 12:30	Akira Kurosawa's Rhetorical Techniques in Yojimbo.
Bigley, Andrew	Poster - 17	Characterization of PhoK-type Phosphatases Implicated in Organophosphate Flame-Retardant Degradation
Bond, Allison	Poster - 24	Towards modeling bimetallic enzyme active sites: using click chemistry to link two ethylene cross-bridged tetraazamacrocyclic complexes with different metal ions
Borrego, Rylee	Poster - 17	Characterization of PhoK-type Phosphatases Implicated in Organophosphate Flame-Retardant Degradation
Buford, Angelia	Poster - 11	The effect of increased pathogenicity of bacteria on the development of Dictyostelium discoideum
Burkhalter, Talyn	Oral Presentation - 2:15	Are They Caused by Environmental Factors or Are They Hereditary?
Byrd, Kylar	Poster - 07	Restoring Southwestern Oklahoma State University's Natural History Museum: A Multifaceted Project
Byrd, Kylar	Poster - 30	Epidemiological Modeling: A Backward Bifurcation Model
Childress, Justin	Poster - 16	Applications of ICP to determine the presence of heavy metals (especially lead and cadmium) in energy drinks.
Childress, Justin	Poster - 23	Stability of the Schiff Base Functional Group in Ni(II) Complexes of Amino Acid Imines
Christian, Jeffrey	Oral Presentation - 1:00	"Class Struggles and Social Commentary: Exploration of 'The Outsiders' and 'The Sneetches' Through a Marxist Lens"
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Cole, Jurnee	Poster - 47	Relations of Visual Imagery Ability to Detail Generation and Text Experience of Visually and Auditorily Presented Stories
Cotton, Seth	Oral Presentation - 2:30	Substance Abuse and How It Hooks People
Cox, Jared	Poster - 13	Analysis of TiO2 in Commercial Chocolate Bars
Cox, Jared	Poster - 24	Towards modeling bimetallic enzyme active sites: using click chemistry to link two ethylene cross-bridged tetraazamacrocyclic complexes with different metal ions
Crisp, Madilyn	Poster - 05	Predation in Western Diamondback Rattlesnakes
Crisp, Madilyn	Poster - 07	Restoring Southwestern Oklahoma State University's Natural History Museum: A Multifaceted Project
Cunningham, Blue	Poster - 04	Nutritional Preferences of Male and Female Fruit Flies (Drosophila melanogaster)
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Delaplane, Caedmon	Poster - 35	Impact of Fire on the Rodent Community in Western Oklahoma Grasslands.
Doss, Melissa	Poster - 29	Comparison of Two Training Protocols for Youth Distance Athletes
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Elam, Grant	Poster - 19	Development of synthetic routes to alcohol pendant arms for tetraazamacrocyclic ligands
Eldredge, Samantha	Poster - 26	Utility of Aldehyde Derived Ni(II) Complexed Schiff Bases of Glycine for the Asymmetric Preparation of -Substituted Pyroglutamic Acid Precursors
Esparza, Colter	Poster - 01	Beyond Sugar: What Pancreatic Cancer Cells Need to Grow
Estala, Eric	Poster - 21	Methods of Analysis for Extraction, Determination, and Quantification of Menthol from Peppermint Leaves
Estala, Eric	Poster - 26	Utility of Aldehyde Derived Ni(II) Complexed Schiff Bases of Glycine for the Asymmetric Preparation of -Substituted Pyroglutamic Acid Precursors

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Faurie, Lauren	Poster - 37	Overwintering Raptor Hunting Behaviors and Habitat Use in Southwestern Oklahoma.
Flores, Kade	Poster - 03	MARS on Mars: Measuring Accommodations in Regolith Soil on Mars -- AI Edition
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Garcia, Jocelyn	Poster - 14	Analytical Quantification and Qualification of Red Dye-40 (Allura Red) in Food Products and the Implications for Potential Health Risks
Garcia, Jocelyn	Poster - 18	Computational and Experimental Determination of the pKa's of Ni(II) Complexes of Glycine
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Gregory, McKaegan	Poster - 05	Predation in Western Diamondback Rattlesnakes
Gregory, McKaegan	Poster - 07	Restoring Southwestern Oklahoma State University's Natural History Museum: A Multifaceted Project
Guthrie, Breanna	Poster - 44	Career Barriers: College students' perceived career barriers after the pandemic
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Guthrie, Breanna	Poster - 48	Relations of Visual Imagery Ability to Emotions Such as Anxiety and Compassion
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Jergensen, Audrey	Poster - 20	Manipulation of the Steric and Electronic Environment of the Methylene Group of Ni(II) Complexed Glycine Equivalents and Their Reactivity
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Long, Scott	Poster - 41	Student Pharmacists' Perceptions on Comfort and Confidence of Dispensing and Counseling Medical Cannabis
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Nilson Jr, Daniel	Poster - 13	Analysis of TiO2 in Commercial Chocolate Bars
Nolen, Caleb	Poster - 37	Overwintering Raptor Hunting Behaviors and Habitat Use in Southwestern Oklahoma.
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Roper, Tori	Poster - 48	Relations of Visual Imagery Ability to Emotions Such as Anxiety and Compassion
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Poster - 01

Beyond Sugar: What Pancreatic Cancer Cells Need to Grow

Student Presenter: Colter Esparza
Faculty Sponsor: Dr. Pragya Sharma

Abstract

Cancer is a disease characterized by uncontrolled growth and proliferation of mutated cells. Cancer cells alter their metabolism to support rapid expansion and meet their energetic demands. One of the hallmarks of cancer cells is their molecular sweet tooth. Unlike normal cells, cancer cells avidly consume glucose and produce lactic acid under aerobic conditions. Research in our lab is focused on pancreatic ductal carcinoma (PDAC), a cancer of the duct cells of the pancreas. PDAC is an aggressive malignancy with a median survival of ~ 10 months and is predicted to become the second leading cause of cancer-related deaths by 2030. We use human pancreatic cancer cell lines Mia-Paca2 to study pancreatic cancer metabolism. While glucose addiction is an important feature of cancer, cancer cells can exhibit remarkable tolerance for nutrient deprivation, including glucose. We tested the metabolic resilience of pancreatic by substituting glucose with galactose as a carbon source, a condition that inhibits glycolysis. Our results indicated a slight decrease in cell viability and suppression of cell growth. More than 60% of cells survived, suggesting that cells might adjust to energy-related challenges through metabolic reprogramming. Cancer cells strive to acquire additional nutrients by hook or crook and use multiple mechanisms to promote their growth and combat cell death. Nutrient sensing by the signaling molecules plays a major part in regulating metabolic processes. Using cell viability assays, RT-PCR (gene expression), and immunoblotting, we are studying the metabolic signaling and role of autophagy in sustaining cancer proliferation under nutrient stress conditions.

Crystal Structure of a Reactive Intermediate Deaminase A (RidA) homolog from Streptococcus sanguinis

Student Presenter: Adreana Aquino
Faculty Sponsor: Dr.Vijay Somalinga

Abstract

Reactive intermediate deaminase A (RidA) is a low-molecular weight, toxic intermediate deaminase belonging to YjgF/YER057c/UK114 superfamily. The archetypal RidA subfamily is involved in amino acid metabolism in all domains of life where it catalyzes the neutralization of toxic 2-amino acrylate (2AA) intermediates produced during amino acid catabolism. In Salmonella enterica, mutants lacking ridA exhibit physiological defects from the antagonistic interaction of 2AA with pyridoxal phosphate (PLP)-dependent enzymes. The importance of RidA in bacterial physiology and the incomplete understanding of metabolic networks affected by RidA led us to investigate its role in Streptococcus sanguinis, an opportunistic pathogen and the leading cause of subacute infective endocarditis in humans. We previously identified a RidA homolog, SsRidA, in S. sanguinis and established its 2AA deaminase activity using biochemical methods. To better understand SsRidA catalytic mechanism, the first crystal structure in holoenzyme and apoenzyme confirmations were solved at 1.97 Å and 2.0 Å respectively. The monomer structure of SsRidA revealed the presence of mixed anti-parallel b-sheets with two a-helices packed against the face of the b-sheets. The overall structure of SsRidA revealed a homotrimeric arrangement with active sites formed at the monomer interfaces, typical for this family. Active site electron density revealed the presence of ligand in only one active site leaving two active sites unoccupied. This incomplete ligand occupancy in SsRidA is still under investigation.

MARS on Mars: Measuring Accommodations in Regolith Soil on Mars -- AI Edition

Student Presenters: Payden Farnsley, Kade Flores, Steve Langstraat, & McKenzie Olson
Faculty Sponsor: Dr. Eric Paul

Abstract

Increasing demand for space exploration is seen as the key to long-term human survival as colonization of extraterrestrial planets come closer to reality. Plants provide food, energy, and oxygen for survival. The NASA-affiliated Plant the Moon competition challenges teams across multiple educational divisions to grow crops in simulated Mars soil (regolith) in a given growth period. Students at Southwestern Oklahoma State University have participated in this challenge and have studied interactions between microbes, Mars regolith, mammal fecal matter, and plant growth for food production. Mars regolith is sterile & devoid of organic matter. It behaves differently than earth soil; parameters involving plant growth have been tested, in addition to soil additives. Total plant yield, soil pH and seedling germination rates have been measured for lettuce, spinach, basil, and radishes, with some of these plants being grown successfully in Mars regolith. A joint research project between computer science and biology at SWOSU will implement artificial intelligence and perform parameter testing on soil additive concentrations and specific growth conditions. Using multiple parameter tests, we anticipate finding the best combination of growth conditions and concentrations for crop yield in extraterrestrial soils.

Nutritional Preferences of Male and Female Fruit Flies (Drosophila melanogaster)

Student Presenter: Blue Cunningham
Faculty Sponsor: Dr. Jimena Aracena

Abstract

Male and female insects often have different nutritional needs. The eggs require protein and lipids, causing the females to search for food with high concentrations of these nutrients. Males only need carbohydrates for energy to find females and mate. We tested the effect of different concentrations (9% vs. 4%) of yeast solution dyed either red or blue on the foraging behavior and feeding preference of fruit flies (Drosophila melanogaster) on a patch of food (yeast solution) in a closed arena. 50 flies were deprived of food for 24 hours and allowed to feed together for 1 hour in the dark. They were then frozen, and their abdomens were evaluated for color to determine their preferred yeast concentration. The feeding patches were square containers (3.4x3.4x0.4cm) with 25 wells containing 10microL of solution. We tested the flies in groups of males only, females only, and mixed sexes. When females fed alone or when both sexes fed together the flies preferred the higher yeast concentration. However, when males fed alone, they showed no preference. This shows that the females have a clear preference for a higher level of nutrients than the males during foraging.

Predation in Western Diamondback Rattlesnakes

Student Presenters: Madilyn Crisp & McKaegan Gregory
Faculty Sponsor: Dr. Renan Bosque

Abstract

The Western Diamondback Rattlesnake (Crotalus atrox) displays an intricate diamond pattern on its dorsal surface, a feature that has long captivated scientific curiosity regarding its role in predator deterrence. This study investigates the evolution of these striking patterns to determine if they function as effective signals for predator avoidance. Utilizing plasticine replicas designed to mimic the rattlesnake's natural appearance, we conducted our experiment to assess the efficacy of these diamond patterns in deterring predators. We recorded predation attempts by closely examining the bite marks left on the replicas. We categorized these predation attempts into two groups: mammalian predations and avian predations, aiming to elucidate potential differences in the snake's interactions with these distinct predator types. Environmental conditions can play a pivotal role in predation attempts. To account for that, we measured the amount of light availability in the snakes' habitats and compared the backgrounds against which the replicas were placed with the coloration patterns of the replicas themselves. This allowed us to discern whether the coloration patterns served as a form of camouflage, or conversely, whether they acted as conspicuous signals to potential predators. Understanding the influence of environmental variables on predator activity was essential to our research. We deployed data loggers to continuously monitor air temperature in the study area, recognizing that variations in this parameter may influence predator behavior and, consequently, predation attempts. In addition, we installed camera traps to identify potential predators of Crotalus atrox. Our investigation provides a multifaceted exploration of the intricate diamond patterns in Western Diamondback Rattlesnakes, aiming to unravel the interplay between coloration, environmental variables, predator behavior, and predation attempts. This research provides valuable insights into the evolutionary significance of these patterns and their role in predator deterrence, shedding light on the complex dynamics of predator-prey interactions.

Preliminary Crystallization of SSA_0908, a Type 1 Periplasmic Substrate-Binding Protein from Streptococcus sanguinis.

Student Presenter: Marshall Koons
Faculty Sponsor: Dr.Vijay Somalinga

Abstract

Subacute infective endocarditis (SIE) is an endovascular infection caused Streptococcus sanguinis, a commensal of thehuman oral cavity. Blood transit, survival in blood andsubsequent attachment to cardiac vegetation is a prerequisite for SIE pathogenesis. While numerous studies have identified cell-surface adhesins in S. sanguinis, many suggested to be involved in SIE remain uncharacterized. We recently identifiedSSA_0908, a putative ABC-transporter substrate binding proteins (SBP) with homology to CD0837, a SBP from Clostridiodes difficle implicated in host colonization and aromatic amino acid transport. Sequence analysis showed that residues involved in aromatic amino acid ligand binding is highly conserved in SSA_0908. Homology modeling of SSA_0908 revealed a type 1 periplasmic SBP fold with two a-b-a sandwich domains connected via a hinge-loop. The ligand binding pocket at the interface of the sandwich domains showsactive site architecture similar to other aromatic amino acid SBP's. Sequence and structural homology of SSA_0908 to other characterized aromatic amino acid transporters indicated that this protein may be involved in similar function in S. sanguinis.In order to further characterize SSA_0908, we have successfully over-expressed and purified this protein using affinity chromatography. Preliminary crystallization trials resulted in crystals in several conditions. We are currently optimizing crystallization conditions to grow diffraction quality crystals.

Restoring Southwestern Oklahoma State University's Natural History Museum: A Multifaceted Project

Student Presenters: Kylar Byrd, Madilyn Crisp, McKaegan Gregory, & Rachel Uhlig
Faculty Sponsor: Dr. Renan Bosque

Abstract

Natural history museums are great resources for scientific research, studies of human occupation, and public outreach. Currently, the accessibility of useful genetic material from historical specimens increases even more the scientific value of natural history museums. Southwestern Oklahoma State University's Natural History Museum (SWOSUNHM) has a wide taxonomic coverage including herpetological, ichthyological, mammal, entomological, and fossil collections. Additionally, the museum harbors a herbarium of approximately 70,000 specimens with great geographic and taxonomic coverage. The museum includes specimens of historical and ecological importance, including centenary specimens like a 125-year-old taxidermied Red-breasted Merganser as well as endangered American eels. Until recently, the museum suffered from insufficient maintenance and curatorial issues which resulted in the damage of several specimens. These issues include inconsistent and absent data records and improper specimen storage and preservation. Currently, we are resuming activities in the museum by digitizing all the physical files present in the museum to create a comprehensive record of the collection. We are systematically restoring evaporated ethanol in wet specimens, replacing inadequate jars and sealing discs, and rehydrating specimens that have unfortunately become desiccated. These protocols are critical for reversing the trajectory of collection loss and have resulted in increased accessibility to research institutions. Shortly, SWOSUNHM will be accessible to both the scientific community and the general public, thereby achieving the primary objective of scientific collections and ultimately restoring our museum's significance to science.

Sexual selection in response to varying levels of cultural eutrophication

Student Presenters: Joseph Alcuitas & Rachel Uhlig
Faculty Sponsor: Dr. Rickey Cothran

Abstract

Sexually selected traits are expensive to build and maintain. This makes them condition-dependent and useful for making decisions about potential mates. However, the condition-dependence of these traits is also expected to make them hypersensitive to environmental change. We explored patterns of sexual selection in populations of amphipods in the genus Hyalella exposed to varying levels of nutrient pollution. These varying levels are likely due to fertilizer runoff from local farms. Higher levels of phosphorous, indicative of high nutrients, were predicted to lead to larger sexually selected traits, the posterior gnathopod (a claw-like trait) and second antenna.We collected amphipods from the lakes and compared male sexual trait sizes. We discovered that males collected from lakes with more nutrients tended to have larger sexual traits. Female choice may be compromised because poor quality males can build larger sexual traits. This could worsen the overall health of the population.

Structural and Functional Characterization of Proteins Essential for Pathometabolism in Streptococcus sanguinis

Student Presenter: Laura Sarchi
Faculty Sponsor: Dr. Vijay Somalinga

Abstract

Streptococcus sanguinis is a non-motile, non-sporulating, facultative anaerobic, Gram-positive cocci that is part of the normal microbiome of the human oral cavity. Although considered a commensal, in people with preexisting cardiac anomalies S. sanguinis can cause an endovascular infection known as sub-acute infective endocarditis (SIE). SIE leads to extensive endocardial, valvular, and systemic damage that requires extensive therapeutic and invasive surgical intervention strategies. Without proper treatment, SIE is 100% fatal and even with modern medical intervention, mortality rates from SIE can be as high as 20%. Over the past decade, several studies have characterized important virulence factors in this organism, but the metabolic enzymes required for the persistence and survival of S. sanguinis during blood transit and in cardiac vegetations remains largely unknown. The data presented here provides an overview of the work done in our laboratory which is focused on characterizing proteins that may play a role in the persistence and survival of S. sanguinis during infection process. In the past few years, we have identified three uncharacterized proteins in S. sanguinis, SSA_2154, SSA_0809 and SSA_0908 annotated as putative carbonic anhydrase (CA), putative enamine deaminase and a putative substrate binding protein (SBP) respectively. To date, we have completed the over-expression and successfully purified all three enzymes for structural and biochemical studies. In addition, using coupled enzyme assays, we have unequivocally demonstrated that SSA_0809 is a reactive imine deaminase A (RidA) family member capable of deaminating toxic imine/enamine intermediates into non-toxic pyruvate. Furthermore, structural analysis of SSA_0809 using X-ray crystallography technique revealed a homotrimeric quaternary structure typical for RidA family of proteins. Qualitative and quantitative analysis of SSA_2154 using protonography and electrometric enzyme assay techniques revealed that this protein is capable of carbonate dehydratase activity. Moreover, the combination of homology modeling along with enzymatic analysis indicated that SSA_2154 is an uncharacterized beta type carbonic anhydrase in S. sanguinis. Finally, sequence analysis and homology modeling showed that SSA_0908 may represent a type 1 substrate binding protein involved in aromatic amino acid uptake in S. sanguinis. To our knowledge this is the first study aimed at deciphering the roles of above-mentioned proteins in the metabolic pathways required for the survival of S. sanguinis during blood dissemination and endocardial growth. We hypothesize that a concerted interplay occurs between these proteins that may play a role in the persistence of S. sanguinis during infection process which will be explored further in the future.

The Effect of Female Mate Choice on Offspring Sex Ratios in a Freshwater Amphipod Species

Student Presenters: Joseph Alcuitas & Rachel Uhlig
Faculty Sponsor: Dr. Rickey Cothran

Abstract

Theory predicts even sex ratios because parents always benefit from producing the rarer sex. However, deviations in nature may occur to maximize reproductive success. On an individual brood basis, females may allocate resources to the offspring sex that returns the most fitness. We hypothesized that choosy females bias sex ratio of broods in favor of sons. Amphipods (Hyalella sp.) were used as it's possible to identify chosen mates because they physically pair for a short period before copulation. We collected mating pairs and a background sample of amphipods from a freshwater spring. Half of the females were separated and re-paired with their original mate—i.e. they chose their mate. The other half of the females were separated and assigned a new male randomly from the background sample. Each pair was placed in a jar inside of an environmental chamber. We checked the pairs three times weekly and recorded offspring sex ratios. As predicted, choosy females produced a higher proportion of sons in their broods than females mated at random. This strategy allows females to maximum fitness by investing in sons only when high quality mates are present in a mating system characterized by strong sexual selection on males.

The effect of increased pathogenicity of bacteria on the development of Dictyostelium discoideum

Student Presenters: Angelia Buford & Christopher Martinez
Faculty Sponsor: Dr. Muatasem Ubeidat

Abstract

Glyceraldehyde-3-phosphate dehydrogenase (GAPDH) is an important highly conserved enzyme in bacteria and other organisms. Its role in glycolysis is essential for bacterial survival. This pathway generates energy for the bacterium and provides intermediates for biosynthesis. Its enzymatic activity and regulation can be targets for drug development, as inhibiting GAPDH could disrupt bacterial metabolism and be a potential strategy for antimicrobial agents.The pathogenicity of bacteria can be influenced by various factors, and some studies suggest that the enzyme GAPDH may play a role in the pathogenicity by upregulating GAPDH and other metabolic enzymes as part of their adaptation to the host environment. This can contribute to their ability to replicate and establish infections. In some pathogenic bacteria, GAPDH has been found to have moonlighting functions. GAPDH can interact with host cell proteins and extracellular matrix components, facilitating bacterial adherence and invasion of host cells. While some research has pointed to these potential roles for GAPDH in pathogenicity, the full mechanisms are not always well understood and require further investigation.¨In this research project, we would like to clone GAPDH as a fusion protein with GFP in bacteria with a promoter that can control the amount of GAPDH expression. Therefore, we are using an Arabinose operon promoter. This way we can observe the expression through the fluorescence of GFP as a reporter gene. GAPDH enzyme activity will be measured using conventional methods.The life cycle of Dictyostelium discoideum, a cellular slime mold, involves both single-celled and multicellular stages. In the early stages of the Dictyostelium's life cycle, the organism exists as single-celled amoeboid cells that primarily feed on bacteria and other microorganisms present in their environment, including E. coli. They use phagocytosis to engulf and digest bacteria, which serves as a source of nutrients for their growth and replication. When conditions become unfavorable, such as food scarcity, Dictyostelium amoebae undergo a remarkable transformation from single-celled to slug and eventually to a fruiting body consisting of stalk and spore cells. As Dictyostelium amoebae form fruiting bodies and spores, they can actively capture and incorporate bacteria into the fruiting body. This behavior can lead to the spores carrying bacteria with them. It is thought that the presence of bacteria within the spores might play a role in their dispersal and survival.The interactions between Dictyostelium and bacteria in its life cycle are a fascinating example of microbial ecology and symbiosis. Scientists have used this model system to study various aspects of host-microbe interactions, nutrition, and the impact of bacteria on the developmental processes of Dictyostelium.¨In our research, we would like to investigate if the overexpression of GAPDH coincides with an increase in the pathogenicity of E. coli toward Dictyostelium. Furthermore, we would like to investigate the mechanism of how the increase in enzyme activity in E. coli affects the developmental process of Dictyostelium.Dictyostelium is known for its chemotactic behaviors, where cells move towards specific chemical gradients. The Study of chemotaxis and cell signaling in Dictyostelium has provided insights into the fundamental processes that guide cell movement and behavior during development. The multicellular development of Dictyostelium relies heavily on cell-cell interactions and communication. Understanding how cells coordinate their behavior during development is a central focus in Dictyostelium research.¨In our research, we would like to investigate the effects of increased or decreased GAPDH expression in bacteria on the response of Dictyostelium to starvation and eventually on the chemotaxis toward cAMP and eventually the effect on the whole developmental cycle.Since Dictyostelium lives on the forest floor in association with bacteria and other organisms, this project might give further insight into how the different organisms interact in case one of them becomes more pathogenic.

Balancing Act: Instagram's Impact on Business Success and Personal Health

Student Presenter: Ethan Franklin
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Ethan Franklin investigates the nuanced impacts of Instagram on both business growth and individual mental health. Franklin will delve into the psychological effects of followers and likes, scrutinizing their influence on self-esteem and professional achievements. His study aims to shed light on the balance between leveraging Instagram for career success and maintaining mental wellness. His presentation will also provide insights into effective and sustainable social media practices.

Analysis of TiO2 in Commercial Chocolate Bars

Student Presenters: Jared Cox, Daniel Nilson Jr, & Jessica Thompson
Faculty Sponsor: Dr. Jon Henrikson

Abstract

Titanium dioxide (TiO2) is used for its color in food and cosmetic products. As a whitening agent in foods, is determined to be safe by the FDA up to 1% by weight food. To confirm that food and commercial cosmetic products adhere to the listed restrictions, it is important to develop methods that can be used to determine oxide concentration. Perchance the methods commonly utilized to study TiO2 content are X-ray Diffraction, Flame AA, mass spec. Previous studies have covered methods to determine TiO2 content via RAMAN spectroscopy, particle size by XRD and electron microscopy, and determined surface properties via light scattering. However direct analysis of food products is still open for further study. In this study, Raman spectroscopy will be used to determine the presence of the oxide in a given cosmetic or food product after isolation of the oxide by high heat. Flame AA will then be used to determine concentration of the Ti. The results of these processes can then be compared to the listed TiO2 contents to see if the concentration is as advertised.

Analytical Quantification and Qualification of Red Dye-40 (Allura Red) in Food Products and the Implications for Potential Health Risks

Student Presenter: Jocelyn Garcia, Yuki Matsui, & Madalyn White
Faculty Sponsor: Dr. Jon Henrikson

Abstract

Red dye-40 (Allura Red) is a dye used in many food products and has many supporting articles linking the dye to the worsening of symptoms in children, although it is by a small amount, overconsumption of Red Dye-40 can increase the risk with Attention-deficit/hyperactivity disorder ADHD, which symptoms include constant fidgeting, an inability to concentrate, being unable to sit still, excessive movement, an inability to wait their turn, interrupting conversations, little or no sense of danger. Red Dye-40 has also been found to be carcinogenic because it contains benzene. Although there is much supporting data, more needs to be collected to prove the theory. In the meantime, the purpose of this study is to quantify, by analytical methods, and qualify, by means of extraction and analysis, Red Dye-40, because if it is proven to be a link methods of detection will be important to knowing whether Red Dye-40 is found in consumable products and how much is found. The different methods of detection found for qualitative and quantitative determination of Red Dye-40 found were solid phase extraction, HPLC (high performance liquid chromatography), and UV-Vis.

Application of DCAD-modified Mitsunobu reactions to cholesterol derivative synthesis

Student Presenter: Daniel Nilson
Faculty Presenter: Dr. David Martyn

Abstract

Using the Mitsunobu reaction, cholesterol was converted into nitrogen and oxygen substituted cholesterol derivatives with varying degrees of success. Successful reactions resulted in replacement of the original alcohol substituent with nitrogen or oxygen bearing nucleophiles. Functional groups introduced by the nucleophiles included amines, ethers, carboxylic acids, and azides. Infrared and NMR spectroscopy studies confirmed the success of these reactions. In the IR, disappearance of the O-H band and appearance of N-H, N-C, and O-C absorbance bands support transformation. Key spectroscopic evidence for conversion comes from the alpha-hydrogen shift in the NMR spectra. The chemical shift of the alpha-hydrogen on the cholesterol starting material is 3.54 ppm, while in ether and azide derivatives, the alpha-hydrogen shifts to 4.08 and 3.77 ppm respectively. Using methodologies tuned to cholesterol, the Mitsunobu reaction was performed on cholestanediol, yielding disubstituted derivatives.

Applications of ICP to determine the presence of heavy metals (especially lead and cadmium) in energy drinks.

Student Presenter: Justin Childress & Audrey Jergensen
Faculty Sponsor: Dr. Jon Henrikson

Abstract

Energy drinks have become increasingly popular especially among the younger generations, ages 18-34. There has been some report and concern that there may be heavy metals in these energy drinks at relatively high levels. Heavy metals such as lead and cadmium are very toxic to the human body and environment in high concentration. This article will discuss a method for analyzing the heavy metal concentrations in energy drinks, especially monster, nos, redbull, and bang, to determine whether they exceed the WHO guidelines for these metals. Methods that have been used to determine these metal concentrations in the literature include, but are not limited to, ICP-MS, dynamic light scattering, and AAS. Of these methods, the most promising appears to be ICP-MS since this method is able to determine the presence and concentration of heavy metals in a sample at one time; however, the initial and operational costs of this instrument are relatively high. AAS, though promising, can be tedious when one is trying to examine multiple metal concentrations since this must be done in multiple studies. Dynamic light scattering can determine presence of nanoparticle metals in energy drinks, but cannot determine concentration of these metals. This study will utilize ICP-MS on 12 samples, 3 from each energy drink brand. 2 mL of energy drink was digested in 2 mL of nitric acid under heat. This was then diluted to 25 mL in water. This sample will be analyzed through ICP-MS after the machine is standardized using a purchased standard. Concentration will be determined in micrograms per liter to compare to WHO guidelines.

Characterization of PhoK-type Phosphatases Implicated in Organophosphate Flame-Retardant Degradation

Student Presenters: Rylee Borrego & Landry Borrego
Faculty Presenter: Dr. Andrew Bigley

Abstract

The PhoK-type phosphatases are of interest in bioremediation and biotechnology due their potential for the sequestration of heavy metals and their implication in the degradation of toxic organophosphate flame retardants. 1-2 The PhoK-type phosphatases are thought to have evolved from the nucleotide pyrophosphatase/phosphodiesterase (NPP) enzyme family. The NPP-family is part of the larger alkaline phosphatase superfamily, but unlike the majority of the alkaline phosphatase family the NPP-enzymes catalyze diesterase reactions rather than phosphatase reactions. 3 In the PhoK-type enzymes the enzymatic specificity has reverted back to a phosphatase. The limited structural information for the PhoK-type enzymes suggests that a key lysine substitution supports the dianionic transition state, but nothing is known about the substrate specificity of these enzymes. 4 Initial characterization of the PhoK enzyme implicated in the degradation organophosphate flame retardants in Sphingobium sp. TCM1 (Sb-PhoK) found that gene expression was regulated in response to organophosphate flame retardants, but no kinetic characterization has been carried out on organophosphate flame-retardant derived phosphoesters.2 Bioinformatics analysis has now identified homologs of Sb-PhoK from numerous members of the Sphingomonadaceae bacterial family. Interestingly, homo logs from known or suspected degraders of the organophosphate flame retardants appear to be more closely related to each other than homologs from more closely related species. A set of homologs of Sb-PhoK from species that are known to degrade organophosphate flame retardants as well as representatives from non-degrading species has been cloned and expressed in E. coli. Each homolog is characterized with a broad set of substrates including common metabolic compounds as well as phosphoesters derived from organophosphate flame retardants to determine the substrate specificity of each enzyme and to determine the extent to which the PhoK enzymes have evolved specifically toward the degradation of the organophosphate flame retardants.

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Computational and Experimental Determination of the pKa's of Ni(II) Complexes of Glycine

Student Presenter: Jocelyn Garcia
Faculty Sponsor: Dr. William Kelly

Abstract

The use of natural and unnatural amino acids has many applications, some of which include mutagenesis, drug design and delivery, and tissue engineering. However, their synthesis remains a challenge. One synthetic method relies on metal complexation of a glycine Schiff's base to protect the amino and carboxyl groups of the glycine. While there have been a number of modifications of the ligand system employed by this method, recent alterations have included the incorporation of various electron withdrawing groups. These alterations are hypothesized to increase the acidity of the C-H bond on the α-carbon of the glycine, thus allowing for milder conditions thus increasing the generality and efficiency of the method. To test this hypothesis, a series of glycine metal complexes have been synthesized. The pKa of the complexes were determined in methanol through spectroscopic analysis of the equilibrium that is established when varying concentration of sodium methoxide. Further validation of the method was established through computational calculation of relative pKa values between each system.

Development of synthetic routes to alcohol pendant arms for tetraazamacrocyclic ligands

Student Presenters: Grant Elam, Yuki Matsui, & Maecy Spencer
Faculty Sponsor: Dr. Tim Hubin

Abstract

We have previously presented synthetic pathways to cross-bridged tetraazamacrocycles with ethanol pendant arms intended to modify the electronic properties of the transition metal complexes formed, with respect to the parent cross-bridged ligand complexes. The ethanol pendant arms were successfully added by reaction of the macrocycle with 2-bromoethanol in some cases, but for certain derivatives, this method failed. We have recently revisited these compounds and developed additional synthetic routes to adding the alcohol functional group pendant arms. In our new approach, we have taken the well-documented successful approach for the synthesis of acetate pendant arms, which involves the addition of ethyl bromoacetate to the macrocycle nitrogen of interest. The resulting carboxylic acid, protected as an ester, can be deprotected via ester hydrolysis to give the desired acetate pendant arms. We realized that if we could use similar ester hydrolysis, but this time using a "reverse ester" protected pendant arm (one where the carbonyl is further from the macrocycle and the ester oxygen closer to the macrocycle), such as 2-bromoethyl acetate, ester hydrolysis would result in an alcohol pendant arm instead of the acetate pendant arm. This method has been successful and details of the syntheses to produce both mono- and bis- alcohol pendant armed macrocycles will be presented. Additionally, these ligands have been complexed with Mn, Fe, Co, Ni, Cu, and Zn. We will report our synthetic strategies and results, as well as a number of X-ray crystal structures of the complexes formed.

Manipulation of the Steric and Electronic Environment of the Methylene Group of Ni(II) Complexed Glycine Equivalents and Their Reactivity

Student Presenter: Audrey Jergensen
Faculty Sponsor: Dr. Trevor Ellis

Abstract

Unnatural or nonproteinogenic a-amino acids continue to play a pivotal role in the advancement of human health. Unfortunately, access to these materials remains limited as challenges remain in their synthetic preparation. While a universal method for the preparation of these materials remains elusive, arguably the most robust and general is the alteration of properly protected glycine equivalents. Of these nucleophilic glycine equivalents, a series of Ni(II) complexed Schiff Bases of glycine have proven to be robust and general. As a result a number of versions of these Ni(II) complexes have been described in which the physical characteristic of the materials can be controlled. However, limited advances have been made toward modification of the electronic and steric constraints near the methylene moiety of the a-amino acid. Therefore, a series of Ni(II) complexes of glycine with strategically placed electron withdrawing groups will be described. Additionally, the reactivity of these complexes will be compared. Drawing on observations from NMR , structural features, and experimental reactivity results, a more complete description of their application and limitations will be presented.

Methods of Analysis for Extraction, Determination, and Quantification of Menthol from Peppermint Leaves

Student Presenters: Eric Estala, Curtis Rodriquez, & Jennifer Saenz
Faculty Sponsor: Dr. Jon Henrikson

Abstract

Mentha piperita, commonly known as peppermint, has been used for medicinal purposes since ancient times due to a compound found within its leaves. That compound is menthol and can be found in medicines such as Icy-Hot, Biofreeze, and Vicks to help relieve minor pain. Menthol makes up about 40% of peppermint, but getting the full yield of menthol can pose a challenge. Methods for extracting menthol efficiently have been developed. Methods to quantify menthol as well as ensuring proper extraction from the other compounds present in peppermint have also been developed. A few extraction and isolation methods include Pressurized Hot Water Extraction (PHWE) and Fractional Distillation while a useful determination and quantification method is Gas Chromatography. PHWE is a green technique that is as efficient as, if not more efficient than, methanol extraction. Fractional Distillation takes advantage of differing boiling points to isolate menthol from other compounds present in peppermint oil. Gas Chromatography is a well-established method for analyzing volatile compounds.

Rings and beads: synthetic tetraazamacrocycles and their transition metal complexes attached to polystyrene polymer beads for use in diverse applications

Student Presenter: Jessica Thompson
Faculty Sponsor: Dr. Tim Hubin

Abstract

Contaminants of emerging concern are typically defined as man-made pollutants that have the ability to escape normal water purification methods. Advanced oxidation processes are one possible route to modifying or destroying these CEC molecules so that they do not accumulate in the environment and lead to unanticipated negative outcomes. To address this need, we have been working with known highly stable oxidation catalysts containing iron or manganese complexed to ethylene cross-bridged tetraazamacrocycles. We have shown that the monomeric catalysts, along with green oxidant hydrogen peroxide, are effective at decolorizing several dye molecules that have been recognized at pollutants: methylene blue, methyl orange, and rhodamine B. We are working towards fixing these catalysts to polystyrene resin beads to create heterogeneous, recyclable water purification catalysts. At the same time, we are also exploring the use of solid phase peptide synthesis (SPPS) techniques to achieve bespoke linked chains of tetraazamacrocycles in high purity for use in biomedical applications. Our progress in both of these "rings and beads" synthetic methodologies will be presented.

Stability of the Schiff Base Functional Group in Ni(II) Complexes of Amino Acid Imines

Student Presenter: Justin Childress
Faculty Sponsor: Dr. Trevor Ellis

Abstract

a-Amino acids have proven useful in diverse industries including but not limited to food, materials, pharmaceuticals, chemical catalysis, and agriculture. Provided the vast application and potential of these unique molecules, their preparation has remained at the forefront of interest of the synthetic sciences for decades. Despite the introduction of numerous methods for the preparation of specific series of a-amino acids in the literature, the development of a general method for their synthesis remains a challenge. Of the methods that have been introduced in the literature, the application of nucleophilic glycine equivalents have shown promise. Of the variety of properly protected nucleophilic equivalents of glycine available, Schiff bases of glycine are among the most useful. Of these, a series of Nickel (II) glycine Schiff bases has proven general and robust, due in part to the added stability of the imine group that is provided by the metal coordination. Despite the utility of these metal complexes, various aspects have yet to be explored. Of specific interest is the stability of the imine functional group of the amino acid. Therefore, a series of experiments were conducted to establish a basis for understanding for the stability of the Ni(II) complex with respect to the electronic and steric environment of the glycine.

Towards modeling bimetallic enzyme active sites: using click chemistry to link two ethylene cross-bridged tetraazamacrocyclic complexes with different metal ions

Student Presenters: Allison Bond, Jared Cox, & Maecy Spencer
Faculty Sponsor: Dr. Tim Hubin

Abstract

Multimetallic active sites are well known in enzyme structures. While some use multiple atoms of the same metal ion, others have different metals as part of the reactive center of the enzyme. Our lab has produced a number of bis-tetraazamacrocylic bimetallic complexes, most often used in biomedical imaging and/or anticancer applications. Filling both macrocycles with the same metal ion is straightforward--just add two equivalents of the desired metal salt. However, controlling the complexation of the two-site ligand to add one metal ion cleanly, followed by addition of a second, different metal ion, has proved challenging. To overcome this problem, we are working towards developing ligands with azide and alkyne pendant arms, respectively. Our goal is to synthesize and characterize the mono-ligand, mono-metal complexes independently, and then "click" them together to give the desired bimetallic complexes for study as enzyme active site mimics, oxidation catalysts, or bioactive medicinal inorganic compounds. Our progress on this project will be presented and will include a number of new ligands, complexes, and X-ray crystal structures.

Use of UV-VIS Spectroscopy to Determine pKa's of Metal Complexed Glycine Schiff's Base in Aprotic Solvent

Student Presenter: Jocelyn Garcia
Faculty Sponsor: Dr. Jon Henrikson

Abstract

Provided the diverse application and potential of α-amino acids, their preparation has remained at the forefront of interest of the synthetic sciences for decades. One synthetic method relies on metal complexation of a glycine Schiff's base to protect the amino and carboxyl groups of the glycine. Recent alterations to the ligand system employed by this method have included the incorporation of various electron withdrawing groups. These modifications are hypothesized to increase the acidity of the C-H bond on the α-carbon of the glycine, with the hopes of allowing increasing generality and efficiency of this reaction under milder conditions. In our previous work, we have have determined the pKa's of the α-carbon of a series of glycine metal complexes through UV-Vis spectrophotometric methods of analysis in non-aqueous protic solvent conditions. However, there were many challenges under these protic solvent conditions. Currently, we are exploring how the overall system changes under aprotic solvent conditions utilizing UV-Vis spectrophotometric methods, as well as incorporating other spectrophotometric methods. The method development of the pKa determination in aprotic conditions and current results will be discussed in this poster.

Utility of Aldehyde Derived Ni(II) Complexed Schiff Bases of Glycine for the Asymmetric Preparation of -Substituted Pyroglutamic Acid Precursors

Student Presenters: Samantha Eldredge & Eric Estala
Faculty Sponsor: Dr. Trevor Ellis

Abstract

The aim of this project is focused on the development of innovative synthetic methodologies for the synthesis of unnatural amino acids. It would be difficult to overstate the biological importance of α-amino acids, the building blocks of life, and perhaps the most studied class of organic compounds. Besides their primary function as structural units of peptides and proteins, α-amino acids also serve countless biological functions in most living things. Nature's exceptional utility of this unique family of compounds has inspired research into the development of novel synthetic variations of these structures for use in pharmaceutical, agricultural, and food industries. Despite developments in the study and application of these vital biological molecules, very few advances have been made in the fundamental science of their synthesis. However, a new Ni(II) complex of a protected glycine will be introduced and its utility demonstrated. This new nucleophilic glycine derivative was prepared to minimize steric interactions with substituents being introduced to the methylene unit of the glycine moiety. The system was evaluated for its utility through Michael Addition Reactions that asymmetrically introduce a new group to glycine. Disassembly of the Ni(II) complex is expected to yield new b-substituted pyroglutamic acids.

CFD Validation of Formula One Aerodynamcis

Student Presenter: Jessica Massey
Faculty Sponsor: Dr. Jeremy Evert

Abstract

Computer-aided design (CAD) has shaped the world around us, with significant contributions ranging from everyday life to the height of competitive sport. Formula One (F1) racing is the pinnacle of motorsport where vehicle aerodynamics is consistently improved to optimize performance. This research study seeks to validate simulated data from a CAD model with wind tunnel and test track data. F1 wings are inverted to create a force above the car that suctions it to the track, this is called ground effect. Well-designed airfoils take advantage of changes in airflow to create significant downforce during sharp turns and still provide low drag for high speeds on the straights. CAD significantly reduces the cost of the design process allowing greater innovation between physical builds. Computational Fluid Dynamics (CFD) is a special type of CAD and can be used to simulate the airflow around wings. This study uses CFD to evaluate the effects of downforce and drag on car bodies. Using CFD to optimize the design helps minimize design costs for airfoils that can maximize the car's performance in the wind tunnel and on the racetrack. The ANSYS CFD software provides airflow models over different F1 front wings, varying wing shapes, and mounting angles. A wind tunnel and R/C car validate CFD predictions for downforce and drag. The data from this study suggests a correlation between CFD predictions and physical world measurements. Previous publications indicate this work can be extended to applications for aircraft design.

Success Stories on the STEM Path: Women in Engineering Technology

Student Presenter: Jessica Massey
Faculty Sponsor: Dr. Sherry Westmoreland

Abstract

In Oklahoma, 25% of the people working in engineering are women. According to reports from the National Science Foundation and other agencies worldwide, there is a severe shortage of women filling these ranks. Encouraging girls to pursue engineering from a young age is just as important as encouraging women in college to pursue an engineering degree. SWOSU has been successful in bringing women into this program and encouraging them to fill the continuous need for brighter minds in the workforce. This research encourages women to share their experiences, and accomplishments while in SWOSU's Engineering Technology degree. The theory about degree interest and the factors involved when choosing a career will be observed in this research. The goal is to encourage others to think about ways to be a part of the workforce development pipeline and help bring more engineers to the table to solve the world's most critical needs.

Comparison of Two Training Protocols for Youth Distance Athletes

Student Presenter: Melissa Doss
Faculty Sponsor: Dr. Vanessa Fiaud

Abstract

Overuse injuries and burn out are two common issues that plague youth distance runners. This study sought to compare a weight-focused training program with a running-focused program for youth distance running athletes over the winter off-season for improvements in balance, VO2Max, and strength. Preliminary results suggest that weight training is an acceptable substitution for running during the 8-week winter off-season, but analysis is ongoing.

Epidemiological Modeling: A Backward Bifurcation Model

Student Presenter: Kylar Byrd
Faculty Sponsors: Dr. Swarup Ghosh & Dr. Sunil Giri

Abstract

Mathematical modeling can be useful in helping us to understand the spread of disease. We can formulate epidemiological models using differential equations. A special type of epidemiological model we will be taking a look at is a backward bifurcation model. In this poster, we will discuss how models are formulated, apply these principles to epidemiology, define backward bifurcation, and analyze a backward bifurcation model. Specifically, we will look at properties of a backward bifurcation model, including equilibrium and its stability as well as reproduction number. Taking a rigorous approach, we will define and prove these properties mathematically.

A Comprehensive Guide To Jazz Pedagogy

Student Presenter: Pamela Welborn
Faculty Sponsor: Dr. Sophia Lee

Abstract

In this study, I categorize a wide range of useful resources necessary for understanding and teaching jazz in high school music programs. This study dissects the different styles of jazz, efficient ways to approach jazz improvisation, and pioneering artists who are critical to listen to for style. Jazz is an original American art form that is not offered in all middle and high schools, or university and college music programs. This genre of music can be viewed as intimidating to many traditionally trained musicians because of the contrasting way music theory is used in the genre. Jazz is known for its use of improvisation, which is not a common practice in traditional Western music. Because of these trademark characteristics of jazz, these are the same limitations that hold many music educators back from approaching jazz pedagogy. The purpose of this study is to make jazz pedagogy more approachable and to increase the number of programs that include jazz pedagogy in their music programs.

Performance Anxiety in Young Professional Musicians

Student Presenter: Zander Bacon
Faculty Sponsor: Dr. Sophia Lee

Abstract

Music Performance Anxiety (MPA) is a fear experienced before, during, and after a performance, audition, or other high-pressure events. While musicians of all ages experience MPA, the focus of this study is on young musicians entering, or have just entered the professional music performance realm, aged from 23-29 years old. Participants were musicians who voluntarily completed a survey answering questions ranging from their experience with MPA, their individual preparedness as a musician, and their motivations towards their music careers. Other studies show that MPA is not primarily connected to social anxiety disorders, and my findings explore what factors of high-pressure events cause musicians to feel anxious about upcoming performances or auditions.

The Awareness of Intergenerational Trauma in Vietnamese American Youth

Student Presenter: Joseph Nguyen
Faculty Sponsor: Dr. Sophia Lee

Abstract

This study aims to explore the awareness and perception of intergenerational trauma in young Vietnamese Americans. The global issue of mental health disorders is a prominent one, and that includes Southeast Asian Americans such as Vietnamese Americans, which presents a variety of symptoms and behaviors that include but are not limited to depression, anxiety, and guilt. Some mental health issues of said population could, however, be recontextualized under intergenerational trauma, which is when a family member is exposed to a traumatic experience before passing the trauma down to someone who did not directly experience that trauma. When first generation Vietnamese Americans who immigrated to the United States have experienced traumatic events such as genocide, war, migration, and various life-altering events, the trauma would then be transmitted through subsequent generations through their parenting styles that are shaped around the parents' traumatic experiences. While transmission of trauma may not be easily prevented, some might think the focus should shift to treatment and emotional processing of said trauma. However, before treating someone with intergenerational trauma, it is important to perceive and acknowledge the existence of said trauma. Therefore, this study aims to explore the awareness and perception of intergenerational trauma in young Vietnamese Americans. This will be done through surveys with questions specifically designed to assess knowledge, attitudes, their environments, and their level of support and coping strategies.

The influence of music for stress reduction and relaxation of music educators

Student Presenter: Sarah Stoffels
Faculty Sponsor: Dr. Sophia Lee

Abstract

The growing interest in music has brought researchers to question the influence music has on stress reduction and relaxation. Previous research has primarily relied on surveys to determine eligible participants and heat induced stress and thus has been unable to adequately determine the effectiveness of music for stress reduction and relaxation for participants that surround themselves within music as a career. I use data from Jiang Jun's The mechanism of music for reducing psychological stress: Music Preference as a mediator, to support the success music shows in stress reduction and relaxation and the likert scale within a survey to determine how music educators are currently engaging with music as a stress reduction and relaxation tool. Contrary to what has been previously found within research, music utilized for stress reduction and relaxation for a music educator has not shown the same calming effects. My findings indicate that engagement with music as a career prevents the effectiveness and utilization of music as a stress reduction and relaxation tool.

Impact of Fire on the Rodent Community in Western Oklahoma Grasslands.

Student Presenters: Coby De Angelo, Daedmon Delaplane, Tyson Eastwood, Ethan Haggard, Tyler Riley, & Chance Smith

Faculty Sponsor: Dr. Zach Jones

Abstract

In Western Oklahoma grasslands, prescribed burns are a commonly used management tool of invasive woody plants, especially Eastern Red Cedar (Juniperus virginiana). Fires are a natural disturbance of grasslands and critical in the maintenance of productive rangelands, while small mammals are an important ecological indicator of grassland condition. We sampled rodent communities on local pastures that have either a recent history of repetitive prescribed burns or none. We found that unburned pastures provided more and taller grass cover than burned ones, and that unburned pastures hosted a more homogenous rodent community with greater abundances of fewer species than recently-burned grasslands. Furthermore, rodent species known to prefer relatively open cover were more frequently found on the pastures subjected to recent prescribed burns, while those favoring dense-cover habitats were more commonly found on the unburned pastures. Evidently, prescribed burns may effectively be used to increase rodent species diversity in Western Oklahoma grasslands.

Juniper Stand Characteristics of Burned and Unburned Trees Following a Prescribed Fire in Western Oklahoma.

Student Presenters: Abriana Frazier, Dalton Grassman, Ryan Kellar, Mirna Lujan, Maverick Smith, & Austin Thomson
Faculty Sponsor: Dr. Zach Jones

Abstract

Prescribed burning is a management tool used in Pyric Herbivory that can assist maintenance of native grassland communities by bringing nutrients to the topsoil, removing shade competitors of grasses, and providing stimulus for restorative growth. One of the primary woody invaders affecting our regional native grassland systems is the Eastern Red Cedar (Juniperus virginiana). In this project we evaluated burned and unburned trees following a prescribed fire to better understand the ways in which tree stand structure affects prescribed fire success in killing invasive junipers. Our hypothesis was that tree stand attributes will affect whether a prescribed fire kills or leaves trees alive. We measured tree sizes, fire-ladder presences, neighboring tree densities, and neighboring tree spatial arrangements. Overall, spatial arrangement of neighboring trees was the only variable to emerge as different between burned and unburned tress in our study. Coupled with earlier work conducted at the same site, our results indicate that prescribed fires with higher juniper mortality rates are more likely to occur in stands where critical space for air movement in the immediate vicinity of individual trees exists during a fire.

Overwintering Raptor Hunting Behaviors and Habitat Use in Southwestern Oklahoma.

Student Presenters: Lauren Faurie, Kyle Gift, Jarrett Justin, Caleb Nolen, Antoine Sanchez, & Jarrett Smith
Faculty Sponsor: Dr. Zach Jones

Abstract

Overwintering raptor species use a variety of hunting methods and perching types to search for prey in the agricultural landscape surrounding Weatherford, OK. Our primary objective was to identify species preferences for perch types (power pole, fence, powerline, tree, or flying) and landscape context (tilled, non-tilled pasture, woodland) near hunting locations. Two 30-km routes were sampled with one north and one south of Weatherford, OK. Data show the following trends: American Kestrels (Falco sparverius) used powerlines and flight for hunting most often; Red-Tailed Hawks (Buteo jamaicensis) preferred flight and power poles most often; and Northern Harriers (Circus cyaneus) were primarily seed hunting while in flight. Additionally, all species used pasture habitat most often. Species' differences in hunting methods and perch types may mitigate competition for common prey items (rodents) in the winter, and the presence of utility poles may support increased abundances of some species' populations beyond what would otherwise be possible. These data indicate that both American Kestrels and Red-tailed Hawks may benefit from the presence of utility poles and lines.

Woody Brush Fire Responses in a Western Oklahoma Rangeland.

Student Presenters: Avonlea Eagan, Paynen Holley, Jonathan Hughes, Ty Scherman, Hardy Sperly, & Caden Steed

Faculty Sponsor: Dr. Zach Jones

Abstract

When prescribed fire is utilized to control invading tree species in rangelands in concert with grazing, it can provide an increase in grass cover concomitant with a reduction in tree cover. However, over time a lack of woody browsing may lead to increases in brush cover that may outcompete grass species in ways that keep a grassland in a sub-climax ecological stage where grasses and associated grassland species fail to predominate a locality where historically they would have been the dominant features. Following a recent prescribed fire to reduce woody species' abundance, we measured post-fire Smooth Sumac (Rhus glabra) characteristics along a transitional sumac edge from within-stand, stand-edge, and outside-stand quadrats. Key aspects we measured at all three transition stages included stem counts (both fire-killed and alive post-fire), bare ground percentage, basal and canopy level woody stem counts, and stem heights for both live and dead stems. Our results indicated that the ratio of dead to live sumac stems was not different along the stand transition, however the relative height of alive vs. dead stems increased from within-stand through stand-edge to outside-stand quadrats. Stem counts and heights overall were greatest within-stand quadrats on average, while bare ground was greatest at stand-edge quadrats. Apparently, prescribed fire in the absence of woody browsers may invigorate sumac stand expansion and persistence.

Comparisons Between Student Pharmacists and Healthcare Majors on Knowledge and Perceptions on Medical Cannabis

Student Presenters: Kaiya Clements, Lyly Van, & Cloe Serre
Faculty Presenters: Drs. Scott Graham Long, Stephen Drinnon, & Lisa Appeddu

Abstract

Objectives: Since medical cannabis use was legalized in Oklahoma in 2018, cannabis dispensaries and medical cannabis use have grown dramatically across the state. A gap in healthcare involvement in the dispensing of this therapy was noted in a previous study that surveyed patients utilizing dispensary services (Van et al., 2023; JAPhA abstract 1197). The objectives of this study are to compare the attitudes and perceptions of student pharmacists and healthcare majors on their knowledge and perceptions of the legality, uses, side effects, and sources of information concerning medical cannabis at a western Oklahoma university. Results will aid in developing curriculum and training of healthcare professionals.

Methods: Starting in September 2023, students from Southwestern Oklahoma State University (SWOSU) voluntarily completed an electronic survey on the Qualtrics online platform. Researchers recruited participants for the survey via flyers posted across the university, mass emails to the student population, on the Canvas web-based learning management system, or in person. Responses reflecting the above objectives were gathered, as well as demographic data of survey participants. Data were compared based on whether students were in the SWOSU College of Pharmacy versus pursuing other SWOSU healthcare degrees (Kinesiology, Pre-Nursing, Nursing, Pre-Pharmacy, Psychology, and Allied Health).

Results: At the time of abstract submission, 49 student pharmacists and 57 healthcare majors had completed the survey. Most students correctly responded that medical marijuana is legal in Oklahoma (95.9% of student pharmacists versus 93.0% healthcare students). Fewer respondents knew that medical marijuana is not legal nationally (77.6% student pharmacists versus 82.5% healthcare students). For student pharmacists and healthcare majors, the three top perceived patient uses were similar – anxiety, pain, and epilepsy / seizures. For student pharmacists, most frequently perceived patient side effects included anxiety, paranoia, and euphoria. Other healthcare majors supposed the most common patient side effects included increased euphoria, disorientation, and anxiety. Student pharmacists and healthcare majors reported using social media, internet searches, and friends as their three top sources of information. Preliminary results suggest medical journals and news sources were also regularly used by students; however, healthcare providers were not common sources of information.

Conclusions: In comparing the perceived uses of medical cannabis to evidence-based sources, both student pharmacists and healthcare majors were mostly correct. Strong evidence exists for its use in the treatment of analgesia and seizure disorder; however, there is limited evidence supporting anxiolytic effects. Both sets of student perceptions of side effects were consistent with what is reported in the literature. However, this study shows a need for students to be using more reputable sources of information, and, in agreement with this, a concurrent study (Van et al., 2024; JAPhA submitted abstract) demonstrates student desire for a more comprehensive formal education regarding medical cannabis. Future directions will investigate other survey questions, as well as evaluate whether having a medical cannabis card or student's hometown (rural versus urban) has an impact on survey responses.

Introductory Pharmacy Practice Experiences in Ambulatory Care Practice: Perceptions of First- and Second-Year Pharmacy Students

Faculty Presenter: Jeremy Johnson

Abstract

Introductory Pharmacy Practice Experiences in Ambulatory Care Practice: Perceptions of First- and Second-Year Pharmacy Students Jeremy L. Johnson, Lisa A. Appeddu, Christy Cox, Jacqueline Gregory, Leanne Showman, Southwestern Oklahoma State University College of Pharmacy.

Objectives: To assess first-year (P1) and second-year (P2) pharmacy students' understanding of ambulatory care (AC) clinical pharmacy practice after a single morning exposure compared to students without an exposure and whether this generated interest in clinical practice.

Methods: Introductory Pharmacy Practice Experiences (IPPE) are commonly scheduled within community and institutional settings. The AC-faculty investigator hosted P1/P2 IPPE students for a single morning exposure to the AC setting. Students who attended AC exposures and those who did not were retrospectively surveyed to assess perceptions of their understanding of community, institutional, inpatient clinical, and AC practices. Participants provided their own definitions of each practice setting and then rated whether IPPE experiences improved understanding and career consideration of each practice setting on a 5-point Likert scale (strongly agree to strongly disagree).

Results: Over two years, 37 students attended an AC exposure, and 17 completed the survey. Responses were compared to 18 control-student responses who did not have an AC exposure. Evaluation of definitions revealed more ($p<.001$) students with an AC exposure (67.1%) appropriately defined AC practice versus control students (30.0%). Highly significant increases in mean ratings were found for understanding AC ($p<.001$) and inpatient clinical ($p<.001$) settings, and for career considerations for AC ($p=.015$) and inpatient clinical ($p=.010$) settings after IPPEs. No differences ($p>.05$) in these measures were found regarding community or institutional settings. Significantly more students with AC exposures reported good understanding of AC clinical pharmacy ($p<.001$) and in considering a career in AC practice ($p=.046$) as compared to control students. Conclusions: A single AC exposure can improve student explanation and self-perceived understanding of AC practices, as well as increase consideration of a career in that setting.

Student Pharmacists' Perceptions on Comfort and Confidence of Dispensing and Counseling Medical Cannabis

Student Presenters: Kaiya Clements, Lyly Van, & Cloe Serre
Faculty Presenters: Drs. Stephen Drinnon, Scott Long, & Lisa Appeddu

Abstract

Objectives: In 2018, the state of Oklahoma passed one of the most lenient medical cannabis laws in the country. Thus, Oklahoman pharmacists and student pharmacists are interacting with patients who are utilizing medical cannabis on an unprecedented scale. A previous study (Van et al., 2023; JAPhA abstract 1197) which surveyed patients from Oklahoman dispensaries demonstrated a general lack of patient education on medical cannabis, conveying a gap in healthcare involvement in the dispensing of this therapy. To this end, researchers aim to address how to train pharmacists to fill this void. The objectives of this study are to assess the current attitudes and perceptions of student pharmacists attending a western Oklahoma university on their perceived self-confidence concerning dispensing and counseling over the use, side effects, and drug interactions concerning medical cannabis. Study results may guide researchers and faculty on curricular decisions concerning medical cannabis in the education of student pharmacists.

Methods: Starting in September 2023, students from Southwestern Oklahoma State University (SWOSU) College of Pharmacy voluntarily participated in an electronic survey on the Qualtrics online platform. Survey participants were recruited in person, via flyers posted around the university, mass emails to the student population, or through Canvas, a web-based learning management system. Participants answered questions on a Likert Scale as to whether they agreed, were neutral, or disagreed to statements regarding their comfort level, as a pharmacist, in working with medical cannabis. Demographic data and responses reflecting the above objectives were collected. Data were summarized using descriptive statistics.

Results: At the time of abstract submission, 46 students completed the survey, which relates to approximately a 15% response rate within the SWOSU College of Pharmacy. When asked about level of agreement on their perceptions of medical cannabis, the largest proportion of student pharmacists responded that they agreed to being comfortable dispensing (41.2%), being confident in counseling over use (48.1%), and being confident counseling over safety (51.9%). However, 41.2% of participants disagreed to being comfortable in counseling on drug interactions. Most student pharmacists (61.2%) reported that they agreed the pharmacy curriculum should devote more resources to medical cannabis education. Furthermore, 50.0% of student pharmacists agreed that pharmacies should be allowed to distribute doctor prescribed, medical cannabis, and 46.8% believed that a pharmacist should be present in cannabis dispensaries.

Conclusions: Based on the data collected, approximately half of student pharmacists convey a general comfort level in dispensing and counseling over medical cannabis. Participants report a desire for a more comprehensive medical cannabis education. Results also indicate that student pharmacists feel that medical cannabis should be dispensed and managed under the care of a practicing pharmacist, just like any other medication. Future directions may compare current practicing pharmacists' perceptions to student pharmacists' perceptions regarding their comfort level in working with medical cannabis.

Synthesis and Biological Characterization of an Orally Bioavailable Lactate Dehydrogenase-A Inhibitors against Pancreatic Cancer

Faculty Presenter: Horrick Sharma

Abstract

Lactate dehydrogenase-A (LDHA) is the major isoform of lactate dehydrogenases (LDH) that is overexpressed and linked to poor survival in pancreatic ductal adenocarcinoma (PDAC). Despite some progress, current LDH inhibitors have poor structural and physicochemical properties or exhibit unfavorable pharmacokinetics. The present study reports the synthesis and biological evaluation of a novel class of LDHA inhibitors comprising a succinic acid monoamide motif we have identified from our virtual screening campaign. The lead compounds exhibit potent binding affinity (KD) in nanomolar concentrations. We solved cocrystal structures that showed that the lead compound binds to a distinct allosteric site between the two subunits of the LDHA tetramer. The lead compounds 6 and 21 demonstrated potent inhibition of LDHA with IC50s of 46 nM and 72 nM, respectively. Inhibition of LDHA correlated with reduced lactate production and inhibition of basal and compensatory glycolysis in MIA Paca-2 pancreatic cancer cells. The lead compound inhibits the proliferation of human pancreatic cancer cell lines and patient-derived 3D pancreatic cancer organoids and exhibits a synergistic cytotoxic effect with an OXPHOS inhibitor, phenformin. Compounds 6 and 21 demonstrated oral bioavailability of up to 73% and a cumulative half-life greater than 4 hours in mice. Unlike current LDH inhibitors, these compounds have appropriate pharmacokinetics and ligand efficiency metrics. The succinic acid monoamide class of inhibitors could be further developed to explore the synergistic and translational benefit of inhibiting lactate production and OXPHOS in PDAC.

Synthesis of a Potential Lactate Dehydrogenase-A Inhibitor Against Pancreatic Cancer

Student Presenter: Madalyn White
Faculty Sponsor: Dr. Horrick Sharma

Abstract

Cancer cells differ from normal cells by up-regulating glycolysis and glucose uptake and converting pyruvate to lactate, even in the presence of oxygen (Warburg effect). Despite having functional mitochondria, cancer cells reprogram their metabolism from oxidative phosphorylation to aerobic glycolysis for survival and growth. Lactate dehydrogenases (LDH) mediate the Warburg effect and convert pyruvate to lactate, producing NAD+, which drives glycolysis for ATP production. Lactate dehydrogenase-A (LDHA) is the major isoform of LDH that is overexpressed and linked to poor survival in many cancers, including pancreatic cancer. Our lab identified novel hits against LDHA through virtual screening and conducted medicinal chemistry-guided hit-to-lead identification, resulting in compounds inhibiting LDHA in nanomolar concentrations. To expand the SAR, we present the synthesis and biological characterization of an analog of our lead compound. The synthesized compound was characterized by NMR and high-resolution mass spectrometry, and percent purity was determined using HPLC.

Career Barriers: College students' perceived career barriers after the pandemic

Student Presenter: Breanna Guthrie
Faculty Sponsor: Dr. Jared Edwards

Abstract

The purpose of this study was to identify the career barriers facing college students after the COVID-19 pandemic. Even before entering the workforce, career barriers impede students' ability to develop professionally. Specific goals, according to Social Cognitive Career Theory, enhance persistence and performance (Lent, Brown, & Hacket, 1994). Career barriers can hinder goals from becoming actions or cause tasks to be approached with less tenacity. Since perceptions may impede professional development, it is crucial to help students minimize perceptions of career barriers so that they can successfully manage career and academic development. Additionally, perceptions of career barriers vary based on the individual as everyone's experience is unique. Therefore, career barriers can be problematic for college students as a whole and for particular types of students, such as those that differ in terms of racial/ethnic backgrounds and gender identity (Gnikla & Novakovic, 2017; Kim & O'Brien, 2018). This is important to recognize since these groups of college students are frequently sought after and recruited by institutions, as well as having a greater proclivity to experience hardships in academic environments. We hypothesized that college students' career barriers following the pandemic would predict a difference in scores for the CBI-R. Significant main effects were found for sex on 8 out of the 13 scales and on the total score. Significant main effects were also found for race/ethnicity on 5 out of the 13 scales and on the total score.

Effect of Elapsed Time and Location of Stimuli on Reaction Time to Visually Presented Stimuli

Student Presenter: Andrew Lockhart
Faculty Sponsor: Dr. Stephen Burgess

Abstract

Previous research has consistently found a reaction time advantage for video game players relative to non-players for a variety of measures, but especially for those that require task switching (e.g., Dykstra et al., 2021). Previous research has also found a reaction time advantage for those who are more physically fit in gamers and non-gamers (e.g., Luu et al., 2021). The reaction time measures used are typically taken at a single time point. In the present study we examined the reaction time of participants at 3 separate time points which were separated by cognitively taxing but non-interesting tasks. Results will be discussed in the context of training possibilities for esports players.

Nesta Archeron: An Adlerian Case Study

Student Presenter: Grace Nelson
Faculty Sponsor: Dr. Taylor Orgeron

Abstract

While many authors aim to emulate and mimic the human condition, not many come as close as Sarah J. Maas does with her character, Nesta Archeron. While Nesta is not human anymore, her development as a character very closely mimics how many people react and cope with their trauma and mental health. Throughout her life, Nesta experiences terrible trauma and develops unhealthy methods of coping, trauma responses, and some disorders as a result. This causes complications with her social and emotional development that can be understood well through the use of Adlerian Psychology. These Adlerian concepts applied to her case are social interest, lifestyle, feelings of inferiority, striving for superiority, and birth order. If Nesta were to seek out help from a clinician using this perspective, some considerations to be made during treatment would be the need to understand the culture of her upbringing, the implications of her being turned into a fae, the cultural differences between fae and mortals, as well as the cultural differences between the courts in Prythian. Some techniques used in Adlerian Psychology that would prove to be useful for Nesta would be: encouragement, “The Question,” Acting “as if,” catching oneself, pleasing someone, and well-being therapy. Lastly, her character and subsequent development have many applications for learning and teaching opportunities, whether it be case conceptualization, teaching concepts of different psychological perspectives, or destigmatizing mental health and its treatment.

Relations of Visual Imagery Ability to Detail Generation and Text Experience of Visually and Auditorily Presented Stories

Student Presenters: Walerie Alvarez, Jurnee Cole, Alicha Francis, Breanna Guthrie, Miranda Hayes, & Tori Roper

Faculty Sponsor: Dr. Stephen Burgess

Abstract

When we read, do we automatically create an image of the characters and the environment? What factors influence the ability to do so? The ability to voluntarily generate visual and other types of imagery varies across individuals (Beran et al. (2023). This ability is linked to differences in episodic memory and a variety of metacognitive abilities (Milton et al., 2021) as well as the experience of emotions (Wicken et al, 2021). Differences in imagery and emotionality of words in written passages have also been related to differences in produced empathy and other emotions. In the present study, we examined the extent to which visual imagery of the participants was related to verbal descriptions of and to recall of details from book passages that they listed to or read. Results will be discussion in terms of implications for reading for enjoyment and other purposes.

Relations of Visual Imagery Ability to Emotions Such as Anxiety and Compassion

Student Presenters: Waleri Alvarez, Alicia Francis, Breanna Guthrie, Miranda Hayes, Tori Roper, & Mena Sanders

Faculty Sponsor: Dr. Stephen Burgess

Abstract

The ability to generate visual images is important for a variety of cognitive and emotional processes. Mental imagery may play a role in several mental health conditions (e.g., social anxiety) (Gorgen, et al, 2015), literacy competence (Mol et al, 2015), and memory. For example, those who demonstrate poor autobiographical memory compared to those who have normal visual imagery ability (Sheldon et al, 2017). It may be a factor in episodic memory formation, the ability to think about future possibilities, the understanding emotional of cues from others and the ability to benefit from previous experiences by reliving them (e.g., Dance et al., 2021; Dawes et al., 2020). Individual differences in mental imagery ability may be a factor in the experience of and anticipation emotions. In the present study we examined the relations of visual imagery ability to a variety of emotions including social anxiety, happiness, generalized anxiety, and compassion. Results will be discussed in terms of implications for different therapies and activities (e.g., meditation) that involve the use of visual imagery.

Relations of Visual Imagery Ability to the Enjoyment of Printed Text Which Differs in Degree of Visual Imagery

Student Presenters: Walerie Alvarez, Alicia Francis, Breanna Guthrie, Miranda Hayes, Tori Roper, & Mena Sanders

Faculty Sponsor: Dr. Stephen Burgess

Abstract

The ability to voluntarily generate visual imagery is an important part of our perception of experience in a variety of tasks. The extent to which visual imager ability is associated with enjoyment, absorption and presence while reading a narrative text remains an area to be researched. Individual differences in visual imagery ability are correlated with less vivid and poorer ability for episodic memories (Milton et al., 2021), greater difficulty imagining future events (Dawes et al., 2022), and are less upsettedness when reading written statements about upsetting scenarios (Wicken et al., 2021). In the present study, we examined the extent to which visual imagery of the participants predicted enjoyment of printed text differing in visual imagery level. Passages containing descriptions of characters and environments were selected from published books. Each description was about 1-2 pages. The selections were left as high imagery or were reduced in imagery by removing descriptor words. Participants read the a passage and rated the extent to which they would like to read more from the book, learn more about the character described, and a variety of assessments of reading habits and visual imagery ability. Results will be discussed in terms of implications for reading for enjoyment and other purposes.

His Wonders to Perform: Progressive Duty in Oklahoma Territory

Student Presenter: Joshua Francis
Faculty Sponsor: Dr. Sunu Kodumthara

Abstract

The passage of the Dawes Act of 1887, facilitated by a shift in federal governance of the American Indian, rapidly changed the lives of resettled Cheyenne and Arapaho tribes in Indian Territory. Progressive reformers assessed the tribal leasing of lands to be an evil arrangement, whose solution would put the Indian to work farming and raising stock. Amid betraying tactics tied to white institutions, the movement failed the tribal people. The collapsed land base that followed, left them economically devastated and unprepared for the coming union of Oklahoma and Indian Territory in 1907.1 Not all reformers idealized their efforts through the institution of labor. An echelon of society was beginning to settle into a middle way of life that held morality, humanity, and understanding as essential hallmarks of modern institutions.2 The Reformed (Dutch) Church in America's work with Indians drew roots back to the mid-1640s, through the Board of Domestic Missions, however, the twelve years preceding 1893 carried little effort or fruit. The Women's Executive Committee of the Board, administered by ladies of this burgeoning middle class, held $4,000 for mission work and a compelling vision "upon their heart" to meet the urgent needs of American Indians.

A True Awakening? Or the Road to Death?

Student Presenter: Hannah Fowler
Faculty Sponsor: Dr. Kelley Logan

Abstract

Throughout history, there are works that exist to emphasize the lack of options that many women face within the world. In stories like The Awakening by Kate Chopin and the film Thelma and Louise, women are shown who experience life-altering, inspiring journeys when they refuse to return to their confining and unexciting lives and instead fully commit to their personal growth along the way. Unfortunately for these characters, though, fully committing ultimately leads them to their death as they see no other choice than to take their own lives because they could not go back to what pushed them away in the first place. While the themes in these stories can be uplifting to young women dealing with choices or the lack thereof because they show that women do not have to be complacent in their lives, they can also be problematic as they imply that the only way out is death. By closely examining these stories and these characters in their final moments, a more inspiring conclusion and message can be drawn from their deaths. This analysis seeks to bring light back to these stories and show that these deaths are meant to be out of place and despairing because they aim to jumpstart a reflection process within both readers and viewers alike that highlights the need to seek out out other options when a woman feels stuck or 'caged' within her life in order to not let their own stories end up like the characters'.

Effective Treatment Through the Use of Radiation in Medicine: A Glowing Review

Student Presenter: James Wingfield
Faculty Sponsor: Ms. Tee Kesnan

Abstract

When most people think of radiation, they think of the atomic bombs or Chernobyl. However, one of the first uses of radiation was for medical purposes. James Wingfield will present the discoveries about radiation that have formed the field of nuclear medicine. Wingfield will discuss how radiation treatments were developed and have been utilized in medicine. He'll detail the different medical conditions that radiation is effective in treating as well as the side effects from radiation treatments.

American Literature

Student Presenter: Andrew Holliday
Faculty Sponsor: Dr. Kelley Logan

Abstract

An examination of American literature throughout United States history.

Anne Frank in Hiding

Student Presenter: Keira Straessle
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Anne Frank in Hiding

Keira Straessle is passionate about this topic, Anne Frank. Having researched this topic since she was in fourth grade, she believes it is important to learn about Anne Frank and the things that went on while in hiding. Straessle will address what life was like for Anne while in hiding, what rules did the people in hiding have to follow, and how Anne changed while in hiding.

Parkinson's Disease

Student Presenter: Mindy Sawatzky
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Based on her research study, Mindy Sawatzky learned that more than 10 million people around the world are living with Parkinson's disease. According to Sawatzky, Parkinson's affects those afflicted and their families in different ways, but not many people know that some of us can be genetically predisposed to come down with this disease. The presenter will discuss Parkinson's disease with her audience members. She will address how people can get this disease, what are its effects, and how the disease can continue through generations.

Invasive Inmates: Burmese Pythons in the Everglades

Student Presenter: Kyle Lane
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Burmese pythons are an increasing concern in the Everglades. Their population is rapidly increasing, and they are affecting the fragile balance of the Everglade's ecosystem. If things continue as they are, the ecosystem could very well collapse completely. Kyle Lane will address how and why Burmese pythons were introduced into the everglades, what effect Burmese pythons are having on the ecosystem, and what efforts are being made to remove and prevent more Burmese pythons from being introduced to the Everglades.

Poster over anorexia

Student Presenter: Adria Lee
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Fear of Being OverweightAccording to the Mayo Clinic, anorexia is an eating disorder that leads to an abnormally low body weight of a person. Studies claim that this disorder is caused by sadness and anxiety. Adria Lee will discuss her personal struggles with anorexia. Lee will also share her research findings on how a person can become anorexic and how an anorexic person can overcome this disorder.

Beyond Borders: The Triumphs and Tribulations of First-Generation Immigrant Students in College

Student Presenter: Manuel Mayorga
Faculty Sponsor: Ms. Tee Kesnan

Abstract

First-generation immigrants have been attending college for many years. However, the challenges that this group has to endure to attend college are often overlooked. Many first-generation immigrants encounter challenges when continuing college due to family responsibilities, financial issues, and lack of support. The struggles that this group faces are vastly different from those of native-born backgrounds. Manuel Mayorga will address what the college experience is like for a first generation immigrant compared to a native-born citizen, what additional obstacles first generation immigrants encounter when they attend college, and what types of aid are being provided to this group of people while they are enrolled in college.

Fort Marion Native American Prisoners: A Blueprint for Assimilation

Student Presenter: Abbyahna Wade
Faculty Sponsor: Ms. Tee Kesnan

Abstract

It is historically known that Native Americans suffered numerous issues, including mass genocide, relocation, assimilation, and much else. Assimilation began through the Native American boarding schools, but what was the blueprint? Native American warriors and chiefs were taken out of Oklahoma and brought to St. Augustine, Florida, Castillo De San Marcos. These men were exploited, treated as prisoners in military units, and assimilated. Abbyahna Wade wants to address why these men were taken, what they endured, and what happened to these men after.

New Daily Persistent Headache Disorder: How This Affects a Person's Life

Student Presenter: Kenzie Waggoner
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Kenzie Waggoner is passionate about raising awareness about New Daily Persistent Headache Disorder (NDPD). Living with this disorder is painful enough to affect a person when performing even simple tasks. Waggoner has this disorder, and it will impact her for the rest of her life. She wants to provide her audience with information about this disorder because it was something she had never heard of until she was diagnosed with this not very known malady. She will address what NDPD is, what type of people is it most likely to affect, and what are the treatment opportunities.

Analyzing Cultural Influences on Perceptions of Men in A Girl Walks Home Alone at Night and "Rape Fantasies"

Student Presenter: Macayla McIntyre
Faculty Sponsor: Dr. Kelley Logan

Abstract

Margaret Atwood and Ana Lily Amirpour's different personal cultural backgrounds seem to explain their different ideologies of men presented specifically in "Rape Fantasies" and A Girl Walks Home Alone at Night. In my paper, I investigate the shared ideals of the cultures these two women were subjected to throughout their lives and compare them to the presentation of their characters, their reflections, and their actions.

Akira Kurosawa's Rhetorical Techniques in Yojimbo.

Student Presenter: Bentley Beam
Faculty Sponsor: Dr. Landrum-Geyer

Abstract

Akira Kurosawa's 1961 film, Yojimbo, has been heralded as a masterpiece by filmmakers for decades. The film has been recreated in different iterations multiple times, and its themes and cinematography have been reused countless times. A classic rhetorical analysis will be used to expose and investigate the devices and figures Kurosawa used to create a film that resonated with viewers in 1961 and still resonates today.

Ocean Pollution in America: How It Affects Our World and Our Marine Life

Student Presenter: Alexis Banderas
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Alexis Banderas will discuss how plastic pollution has been affecting our planet for decades and what can be done to make the drastic change needed. Plastic pollution is extremely harmful to not only our marine life's well-being but also to us humans. It fouls the water we drink and the food we eat. Banderas will also address what ocean pollution is, what has been done to lessen it, and what can be done in the future. Her investigation hopes to spread awareness to those who are concerned about the well-being of the ocean, about marine life, and most importantly, about our health and the health of future generations.

"Class Struggles and Social Commentary: Exploration of 'The Outsiders' and 'The Sneetches' Through a Marxist Lens"

Student Presenter: Jeffrey Christian
Faculty Sponsor: Dr. Kelley Logan

Abstract

Dr. Suess and S.E. Hinton comment on social issues through their texts The Sneetches and The Outsiders. Socio-economic class struggles is a theme that transcends many genres of literature. Both authors use their texts as a positive call for action. Through use of narrative and symbolism, both authors speak on class division in unique ways, pointing out the negative effects of capitalism and class division and how the characters of each text choose to overcome their struggles rather than stay content with their lives.

American Sign Language: How the Absence of this Language in Elementary School Curriculum is Affecting Our Youth

Student Presenter: Hannah Strickler
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Hannah Strickler noticed that although the CDC states that “two to three infants per 1,000 live births” are affected by congenital hearing loss, American Sign Language (ASL) is not something that is regularly integrated in Elementary School Curriculum in the United States. Hannah will address what ASL is, how children with hearing disabilities would be affected by ASL not being taught from an early age, and how ASL can be integrated into elementary school curriculum.

The Silent Erosion: An Alzheimer’s Outlook

Student Presenter: Shaun Scheurer
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Shaun K. Scheurer will discuss how serious a disease Alzheimer’s is. Scheurer will also describe the erosion of the mind during the early and end stages of this disease. Then lastly, he will cover how a person who suffers from Alzheimer's may slow down the progression of this disease.

Body Dismorphic Disorder

Student Presenter: Ebunoluwa Anuoluwapo "Gigi" Aluko-Olokun
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Ebunoluwa Anuoluwapo Aluko-Olokun’s research delves into Body Dysmorphic Disorder (BDD), a mental health condition which affects about 2.9% of the global population. This condition is predominantly observed among teenagers and young adults. Explored through personal insights and reputable sources, her studies identify BDD's obsessive nature linked to brain factors like serotonin levels and genetics, emphasizing its association with obsessive-compulsive disorder (OCD). Symptoms encompass obsessive focus, repetitive checking, and avoidance behaviors, with a distorted self-perception. Environmental causes, such as the impact of social media and public opinion, are investigated, revealing how the digital era intensifies BDD through unrealistic beauty standards. The Covid pandemic emerges as an additional contributor. In her presentation, the Ebunoluwa will also address Johns Hopkins Medicine's research and treatment options, including cognitive-behavioral therapy (CBT) and medication. The study underscores the significance of a combined approach for optimal effectiveness. Personal efforts in self-reassurance and building confidence are highlighted as complementary elements in the journey toward alleviating the burdens of BDD.

Lack of Physical Activity in America

Student Presenter: Kyler Whetstone
Faculty Sponsor: Ms. Tee Kesnan

Abstract

The number of people in the United States suffering from obesity and mental health issues is higher now than it's ever been. Khyler Whetstone is passionate about the need for America's population to become more physically active. She strongly believes that physical activity is a natural tool for physical and mental health improvement. Khyler's presentation will address how physical activity affects physical health as well as mental health, and how people can incorporate "simple" physical activity into their everyday lives.

Are They Caused by Environmental Factors or Are They Hereditary?

Student Presenter: Talyn Burkhalter
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Cases of brain aneurysms are increasing in the United States. Studies show that 17,090,721 people in America will have a brain aneurysm in their lifetime. Talyn Burkhalter hopes to raise awareness among her audience members about how environmental factors contribute to this condition. She will also explore whether brain aneurysms have genetic causes and whether people can possibly prevent a brain aneurysm.

Substance Abuse and How It Hooks People

Student Presenter: Seth Cotton
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Do you know someone who suffers from substance abuse? According to the National Center for Drug Addiction Statistics (NCDAS), almost 19 million people aged twelve and above require drug addiction treatment. Access to drugs has made drug abuse more widespread. Seth Cotton will discuss what drug addiction is, how it can impact someone's life, and why some people become hooked to substances more quickly and for longer periods than others.

Flat Earth: A Curious Falsehood

Student Presenter: Dayne Perrson
Faculty Sponsor: Ms. Tee Kesnan

Abstract

Most people would agree that the earth is round. Note how I say "most" people. Though the belief is uncommon, there is still a fringe group that believes that the earth is actually flat, like a disc. In his research presentation, Perrson, a flat-earth enthusiast, will discuss why some people still believe the earth is flat seemingly in spite of evidence to the contrary, what evidence do they have to support their theory, and how does this belief influence the lives of its holders.