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A & A/

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Greetings!

e University of Arkansas - Fort Smith proudly welcomes you to the 17th Annual Student Research Symposium. Our faculty and sta are committed to fostering an environment that promotes learning and discovery. As you will see in today's presentations, our students have accepted the challenge, explored unique areas of research, and synthesized their results in the form of lectures, studio art, demonstrations, posters, and performances. ese presentations represent

Library 122 – Presentations in Engineering and Computer Science

Noon Issair Rodriguez, Dylan Jetton, and Alexandria Yang – Lunar Terrain Vehicle

12:30 Chaarlee Hickman, Evan Piovesan, Han Tran, and Alex Tran – e Autonomous Vehicle Challenge

1:00 Carter Freeze, Tahlia Bergeron, Tyler Johnson, and Cody Mizell – NumaGuard: Automating Shoulder Sur ng Attacks on Mobile Phones

1:30 Michael Resendiz, Marco Garcia Montes, Josue Martinez, and Cameron Taylor – NumaFARM: An Autonomous Robotic S(Chaarleb0 F)4 0.3rm24 (Uy M)12.s24 (ual

Library 209 – Presentations in English and Literature

Noon Isabella Serrano – Escaping Blood: e Intersection of Race and Gender Identity in Brit Bennett's Novel " e Vanishing Half"

12:30 Rebecca Morrison – " e pen has been in their hands": e Preservation of Female Autonomy in Austen's "Persuasion"

1:00 Tatum Leary – Weaponizing Femininity and Romance: Gender as a Performance and Compulsory Heterosexuality in e Hunger Games Trilogy

1:30 Gabbie Stokes – "Pride and Prejudice and Zombies": e Unmentionable Parody Adaptation

Health Science 121 – Presentations in Accounting and Public Transportation

Noon Noah Ottman – e Current State of Corporate Social Responsibility

12:30 Joy Wootton – Accounting for Cryptocurrencies by GAAP Standards

1:00 Dalton Oxford – A Study of Crime Relations to Public Transit Commuting in Pre-COVID America

Health Science 124 – Presentations in History, Political Science, and Costume Design

Noon Korina Lopez – e Nightmare Beyond the Battle eld: A Glimpse into Civil War Prison Camps

12:30 Mitchell Collins – e Rise of Political and Social Distrust, Division, and Disenfranchisement in Modern Institutions

1:00 Gavin Garrett – Cut, Curate, Costuming: A Costume Designer's Process

Health Science 133 – Presentations in Chemistry, Biochemistry, and Latino Studies

Noon Khuong (Peter) Ta –

Poster Presentations
Noon to 2 p.m., Boreham Library

Table 1 – Chemistry: Sully Sanford – Molecular Dynamics Study of Organochlorine Ligand Interaction with Human Serum Albumin

Table 2 – Biochemistry: Luke Jodoin – Investigating Galectin Glycoprotein Interaction with Sialoglycans and Nanoparticles

Table 3 – Evolutionary Biology: Armonii Dixon and Kiara omas – Phylogenetic Analysis and Molecular Adaptation Events in Whales and Dolphins

Table 4 – Evolutionary Biology: Ciera Grijalva – Molecular Evolutionary Analysis of Jelly sh: Insights from COI and cyt-b Gene Sequences

Table 5 – Evolutionary Biology: Laney Wagner – Exploring Evolutionary Dynamics in Old-World Mice and Rats: A Molecular Analysis of COI and cyt-b Gene Sequences

Table 6 – Biology: Nayda Barbry, Samantha Gates, and Lana Putman – Probiotics: Capsules, Gummies, and Liquids and the Impact of Delivery Methods on Growth Rates

Table 7 – Biology: Analise Black, Anna Carden, and Noah Tawney – Land-use and Di use Pollination: A Look at Jack Nolan Lake in Greenwood, Arkansas

Table 8 – Cell/Developmental Biology: Evan Wittig – Exploring Genetic and Environmental Factors that Control Di erentiation of Pseudoplasmodium in Dictyostelium discoideum

Table 9 – Geoscience: Kaleb McLaughlin – Distribution of Detrital Sediment Captured in McKay Bay Member Knoll Reef, Upper Peninsula, Michigan

Table 10 – Geoscience: Abigale Kelly, Perla Romero, and Matt Van Tassell – Testing the Accuracy of Polycam® 3D Scanning Software on LiDAR and Optical Photogrammetry Devices in Field Research

Table 11 – Geoscience: Emily Mero – X-Ray Di raction and Petrographic Analysis of Magnet Cove Carbonatite Core, Arkansas

Table 12 – Hydrogeology: Abigail Carico – A Darcy Column for Demonstration and Research in Hydrogeology

Table 13 – Hydrogeology: Juan Lopez and Kendal Dixon – A Benchtop Model of Piezometers Used to Determine the Vertical Flow of Groundwater

Table 14 – Nursing: Gracie Larru and Polly Hoang – Pediatric Suicide Risk Associated with Social Media Use: A Literature Review

Table 15 – Nursing: Gerbert Floreschavez – Male-Oriented Recruiting, Job Satisfaction, an Retention Practices in Nursing

Table 16 – Dental Hygiene: Samantha Baughman, Jenny Kindle, and Parker Lemley – e Evolution of Dental Radiology Safety

Table 17 – Dental Hygiene: Dulce Gutierrez, Leslie Guerra, Amy Le, and Abigail Mussett – Look Out Fluoride, E til’af1,g.9 (z and K)oluoride, E

Lunar Terrain Vehicle

Presented by: Issair Rodriguez, Dylan Jetton, and Alexandria Yang
Faculty Sponsor: Dr. Kevin R. Lewelling
Field of Research: Engineering

UAFS mechanical and electrical engineering students have designed and constructed a Luna Terrain Vehicle (LTV) as a response to a NASA request for information. is engineering group constructed a full-scale LTV prototype that features a folding mechanism reducing storage spa e current LTV is capable of handling two astronauts at a speed of 5 mph with an expected driving time of 20 hours. e LTV features include all-wheel drive with 360° wheel rotation, LED headlights, rear camera, and a human machine interface.

e LTV has also provided a platform for freshman engineering students to get involved with research and design. Over 75 fall 2023 freshman engineering students were challenged to de and implement unique features on the LTV: these included LED headlights, back up camera, a touch screen controls.

is presentation will review LTV design analysis and construction; how theory, reality, economi in uenced the LTV design. We will discuss several things learned when constructing this LTV will guide a new generation of LTV design. Also, we will discuss future LTV work.

Autonomous Vehicle Challenge

Presented by: Chaarlee Hickman, Evan Piovesan, Han Tran, and Alex Tran

NumaFARM: An Autonomous Robotic System for Sustainable Farming

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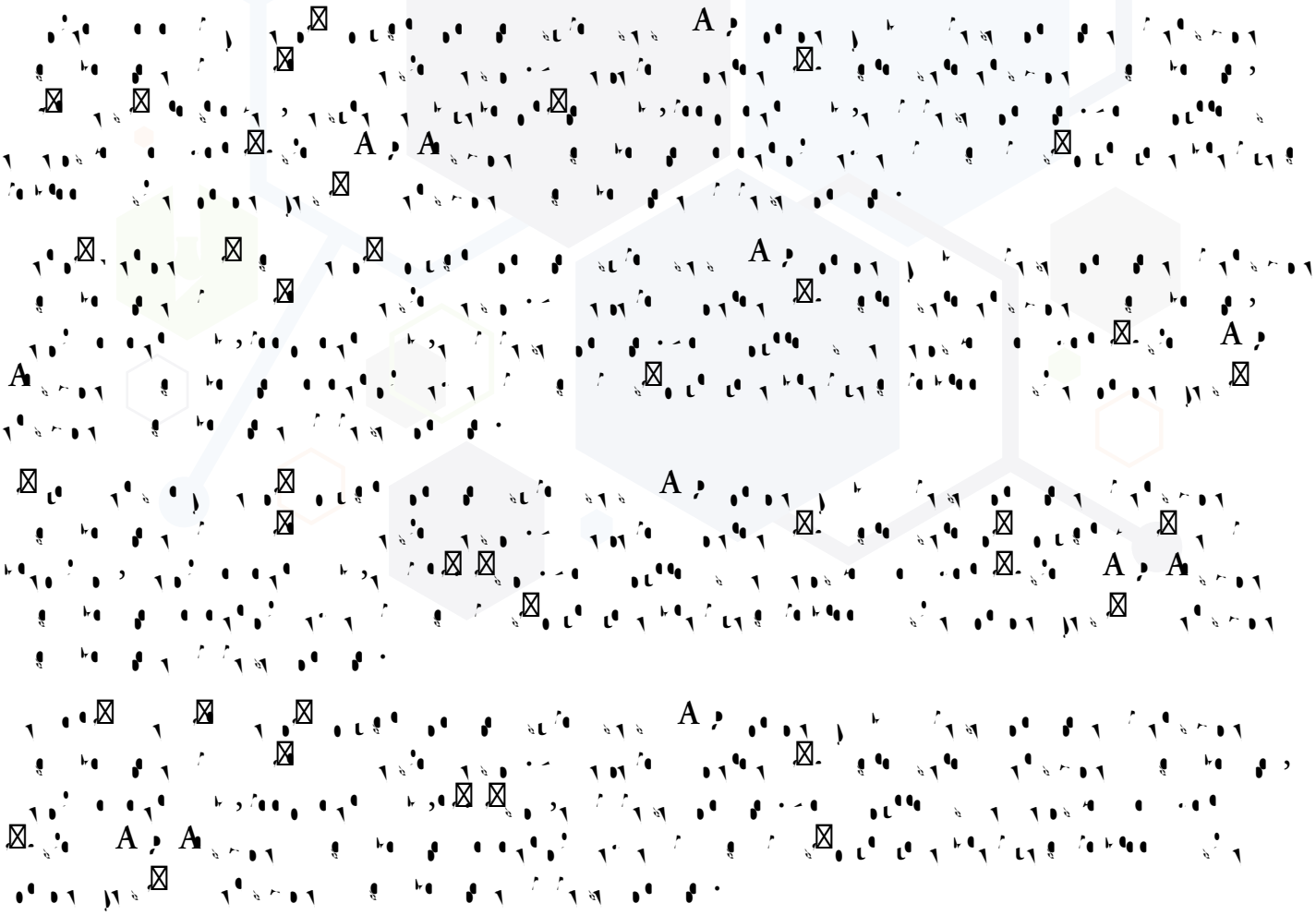
Presented by: Michael Resendiz, Marco Garcia Montes, Josue Martinez, and Cameron Taylor
Faculty Sponsors: Andrew Mackey and Israel Cuevas
Field of Research: Computer Science

Autonomous robotic systems powered by arti cial intelligence and computer vision provide new pathways for sustainability in farming for the state of Arkansas. In this presentation, we present NumaFARM, an autonomous robotic system that is capable of automating farming practices usir arti cial intelligence, computer vision, and deep learning. Our proposed system autonomously manages crops for crucial farming operations, including planting, irrigation, and harvesting. roug real-time monitoring of crop health to automated harvesting using autonomous robotics, NumaFA seeks to improve e ciency, productivity, and resource allocation for one of Arkansas's largest indu



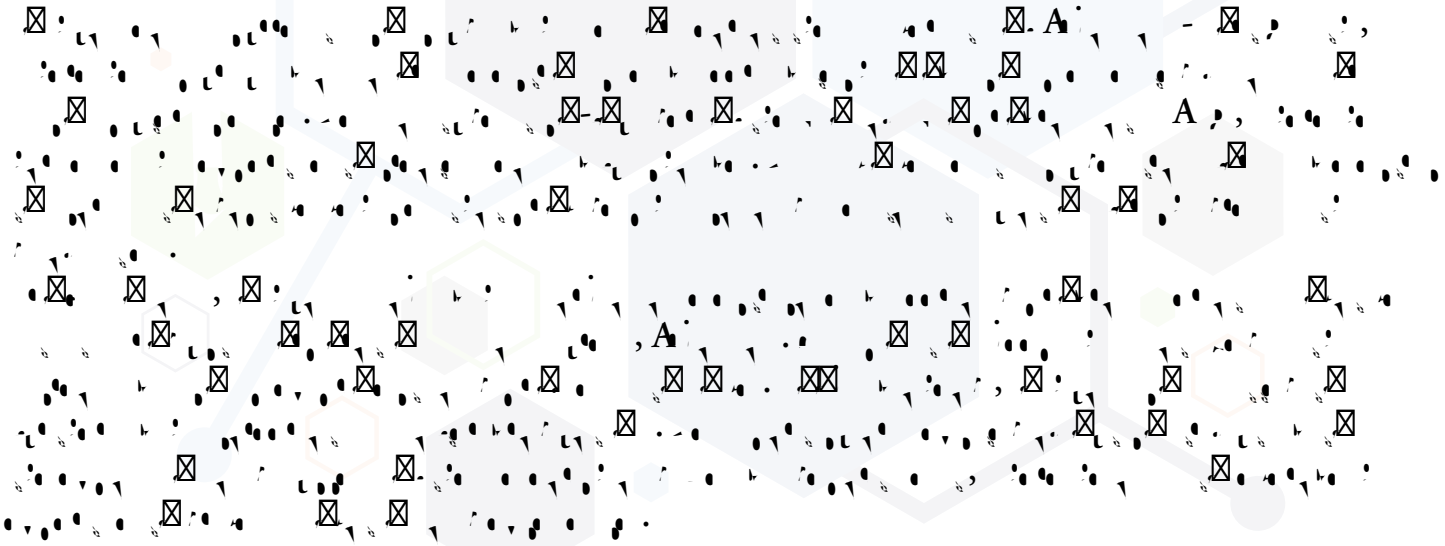
Library 202 Presentations in Electrical Engineering & Control Engineering

Noon	Joshua Bean
12:30	Michael Arellano, Luis Romero, and Tanner Harmon
1:00	Christopher Limon, Bryce Barentine, and Felipe Ortiz
1:30	Tyler Walker and Bryer Duboise

Digitization of Earth Gradient Cable Fault Localization Methods

Presented by: Joshua Bean
Faculty Sponsor: Dr. Kiyun Han
Field of Research: Electrical Engineering

Since the 1970s earth gradient techniques have been fundamental in locating cable faults. es techniques typically involve A-Frames, which utilize a transmitter to send a high voltage pulse through a faulted cable. e receiver then measures the voltage generated in the soil as it retur the transmitter, indicating the fault's location. Traditionally, such devices employed analog disp like galvanometers, to provide visual feedback to the user. However, with the evolving industry landscape, these analog components are increasingly di cult to procure, prompting a growing demand for digital solutions. is presentation aims to highlight the advantages of developing a digital fault locator that leverages this traditional method. It will delve into the challenges encountered in designing such a device, the solutions implemented to overcome these obstac rationale behind speci c design choices, and, nally, the presentation of a fully functional digita fault locator prototype.



Luminescent Jacket

Presented by: Michael Arellano, Luis Romero, and Tanner Harmon
Faculty Sponsor: Dr. Kiyun Han
Field of Research: Control Engineering

Traversing on roadways requires crucial communication between all roadway users to ensure utmost safety for everyone. An estimated combined 85,000 motorcyclists/cyclists are involved an accident each year according to multiple sources. We determined that the Luminescent Ja would be a great starting place to address this matter. e Luminescent Jacket would allow use to enhance their sense of safety and be able to operate their respective form of transportation wearing the jacket the rider will be more visible while also accurately depict in which direction

Wireless Incorporated Car Cooler System

Presented by: Christopher Limon, Bryce Barentine, and Felipe Ortiz
Faculty Sponsor: Dr. Kiyun Han
Field of Research: Electrical Engineering Technology

In response to the intense and continuously increasing summer heats, the WICCS (wireless Incorporated Car Cooler System) was developed to combat excessive internal car temperature shades do not provide comfortable entry to a vehicle during the hottest months of the year. Ou design uses water as the circulating coolant and utilizes gel-based ice packs. A small water pu used to circulate water through a mini radiator, fans are used to circulate hot air from the car a the ns of the radiator. e system will be comprised of a main unit and controller unit, these units will be able to communicate via LoRa based communication modules. rough study and experimentation, our project will provide data on the overall usefulness of a product such as th at varying temperatures. Implementation of this design allows us to record useful information a the e ectiveness of hardware such as Arduino, power supplies and communication modules wh subjected to extreme/maximum temperature values. Statistics recorded for temperature di eren achieved using sun blocking shades with versus without our intended design will be the focus f research project.

Wearable Digital Multimeter

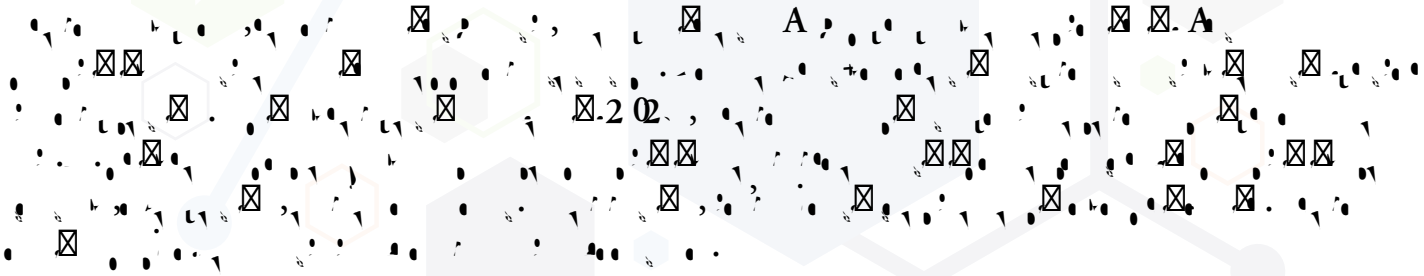
Presented by: Tyler Walker and Bryer Duboise
Faculty Sponsor: Dr. Kiyun Han
Field of Research: Electrical Engineering Technology

e digital multimeter (DMM) is a ubiquitous tool within modern industry, used by the local HVAC company as much as NASA; however, despite how common it is, it still has its faults. W our project, the “Wearable Digital Multimeter,” we hope to solve at least one of them by making it far easier to access both out in the eld and inside the factory by attaching the very same too a technician’s wrist in a way that is both convenient and safe for any environment they might n themselves in. is project uses a standard PCB board, an LCD display, a spring mechanism for retractable wire leads, a ashlight, and self-fastening straps. e retractable wire leads of the dev will be used to measure resistance, voltage, current, and continuity and display the results on t

Correlation in Student Involvement on Campus and Student Success

Presented by: Braden Nguyen
Faculty Sponsor: Dr. Nicha Otero
Field of Research: Psychology

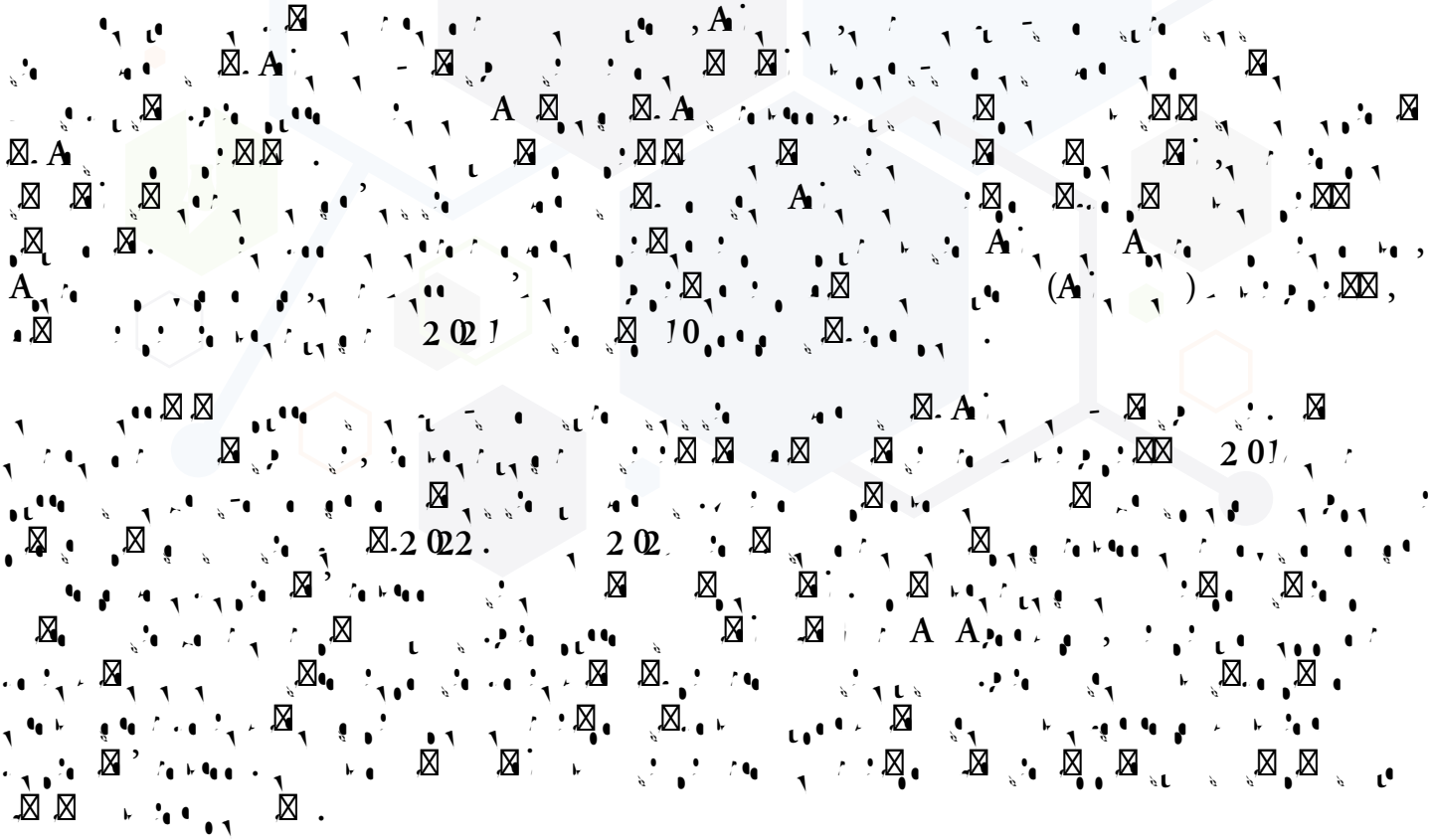
While undergraduate students across universities perform poorly, possibly leading to academic failure, research studies have explored one factor to explain student success, which is campus involvement. Although it is impractical to identify a single measure of student success or lack thereof, grade point average (GPA) is one of many indicators of how well a student is succeedi Longitudinal research studies have also been conducted that tracked students and their GPA a how it corresponded with involvement on campus. e current study examined the relationship between student involvement and student success. We hypothesize that there is a positive cor between student involvement and student success. Students from the University of Arkansas – Smith were asked to complete a six-item demographic questionnaire along with two surveys as about their involvement. e results revealed there was a strong positive relationship between student involvement and student success. Previous works from Bergen-Cico and Viscomi (201 2013) support the ndings that students' participation in activities enhances the likelihood of do well in their courses. Future research will investigate if there is a true di erence between studer classi cation and involvement with student success, types of involvement, and recommended quantity of such involvement.



The Neurobiology of Maternal and Paternal Behaviors

Presented by: Lilly Brasuell and Jaylin Barroso
Faculty Sponsor: Dr. Nicha Otero
Field of Research: Psychology

is research review covers the neurobiology of maternal and paternal behaviors. e cause of this neurobiological shift is within the complexities of the social learning processes, brain circularity, and hormonal regulations. Many of these behavioral shifts are due to survival instincts that peop have naturally. ese natural instincts are what make it possible for o spring to thrive, grow, and adapt in the real world. e study will also show the positive impacts these parenting behaviors h on the child and parent. Many parenting behaviors are known to in uence and shape the child's characteristics. ese behaviors may arise due to biological factors such as hormones. Particular oxytocin, estrogen, progesterone, prolactin, testosterone, and vasopressin. e areas of the brain that undergo these changes include the hypothalamus, amygdala, prefrontal cortex, and the nu accumbens. ese regions of the brain are highly active in maternal and paternal behaviors. e research will investigate the di erent parenting styles that occur because of these biological in u



The Physiological Process of Emotions and Trauma

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Faculty Sponsor: Dr. Nicha Otero
Field of Research: Psychology

is paper is a systematic review of previous research that aims to explore the physiological pro involved in the experience of emotions and stressful or traumatic events, which can lead to lon lasting responses to our environment. Physiological processes, regarding trauma and emotion complex. Trauma and emotions may be either temporary or chronic and trigger di erent parts o nervous system, including the autonomic nervous system (both the sympathetic and parasymp divisions), limbic system, and hypothalamic-pituitary-adrenal (HPA) axis. e body's physiologica responses to stress, also known as emotions and trauma, in uences the long-term outcomes f itself. Dysregulation between stress responses may cause other mental health issues as well. a ect cardiovascular health, the immune system, emotional responses, memory, regulation, an overall well-being of a person. Furthermore, understanding the intricacies of the di erent syste involved within stress responses may also help further the research and progress for the treatm individuals with post-traumatic stress disorder.

Generational and Historical Trauma Affecting Native Americans

Presented by: Madison Cossey
Faculty Sponsor: Dr. Nicha Otero
Field of Research: Psychology

To what extent does the enduring legacy of generational and historical trauma signi cantly shape the contemporary well-being, mental health, and cultural resilience of Native American communities today? Native Americans continue to experience the detrimental impacts of generational and historical trauma, as evidenced by persistent mental health disparities, socia challenges, and cultural disruptions within their communities. is project is a quantitative and qualitative research design that used google forms as a survey tool and interviews for a more depth perception. e survey and interviews were conducted virtually and in-person to anyone willing to participate. Findings indicate that Native American individuals and communities are indeed impacted by the lingering e ects of generational and historical trauma. is underscores signi cant impact of generational and historical trauma on Native American communities. e da highlights the enduring in uence of historical events on the well-being and experience of Nativ individuals. Recognizing and understanding these challenges is crucial for developing targete interventions and support systems that address the unique needs arising from the complex in of generational and historical trauma within Native American communities. e data advocates proactive measures to disrupt the continued perpetuation of trauma and to promote healing a resilience among Native communities.

Library 209 Presentations in English & Literature

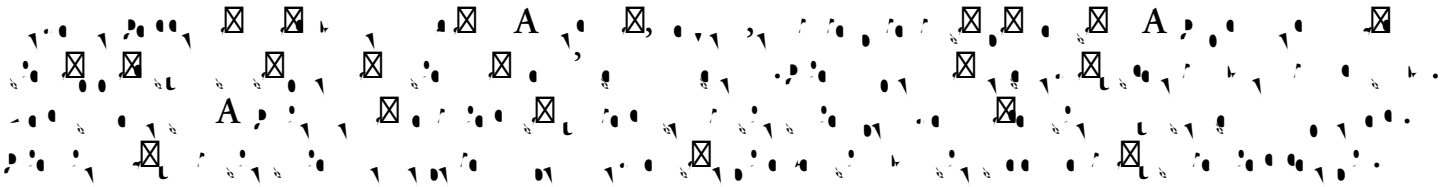
Noon	Isabella Serrano
12:30	Rebecca Morrison
1:00	Tatum Leary
1:30	Gabbie Stokes

Escaping Blood: The Intersection of Race and Gender Identity in Brit Bennett's Novel "The Vanishing Half"

Presented by: Isabella Serrano
Faculty Sponsor: Dr. Lindsy Lawrence
Field of Research: English

In " e Vanishing Half" (2020), Brit Bennett explores how di erent dimensions of identity intersect, speci cally the intersection of race and gender. Bennett positioned her novel during second half of the twentieth century to re ect the overlapping strands of racism and sexism fa by her dual protagonists Desiree and Stella. " e Vanishing Half" is a part of a long history of narratives exploring how racial passing as white alters a character's identity beyond just their in particular the passing of whiteness alters a woman's experiences in sexism. Racial passing when a person classi ed as a member of a racial group is accepted or perceived as another. B reimagines the well-worn elements of racial passing literature through one of her protagonists Stella Vignes is a light-skinned black woman who passes as white, whereas her identical twin Desiree stays true to her roots and remains a black woman. Desiree and Stella serve as the p foil to one another, although their womanhood is uniting, the white privileges granted to Stella not to Desiree create a divide.

Drawing primarily from the work of Kimberlé Crenshaw's intersectionality theory, along with Simone De Beauvoir and bell hooks, Crenshaw's term "intersectionality" (1989) suggests that t is double discrimination of racism and sexism faced by black women. erefore, to only contemp Desiree and Stella's female identity as molding their daily experience would be a misdiagnosis, because the sexist discrimination Desiree and Stella face is heavily in uenced by their racial id as black and white women. Desiree's discrimination as a female is compounded by her race, w Stella only considers her womanhood as causing her unjust treatment rather than how her pas whiteness contributes to her sexist inequality. I argue that in Bennett's novel " e Vanishing Half, Desiree and Stella's diverse experiences exempli es that sexism is not monolithic, but heavily impacted by other points of advantages and disadvantages in their identity, primarily their race



“The pen has been in their hands”: The Preservation of Female Autonomy in Austen’s “Persuasion”

Presented by: Rebecca Morrison
Faculty Sponsor: Dr. Lindsy Lawrence
Field of Research: English

Jane Austen’s 1880 novel “Persuasion” satirizes nineteenth century society’s perceptions of ge e protagonist, Anne, is believed to have missed her opportunity to nd security and ful llment through marriage. Eventually, she nds love with a man who completely respects and admires despite Anne being in her late twenties – an incredibly progressive narrative choice for the tim Many scholars, including Warhol and Morrison, have previously analyzed Anne’s portrayal and gender in “Persuasion,” but my focus is on how Austen uses the con nes of a socially-acceptab heterosexual relationship to demonstrate the potential for equality within marriage. Utilizing wo of feminist theory by Butler and de Beauvoir, as well as articles from scholars such as Warhol a Brown, I suggest that Austen’s masterful depiction of a relationship in which female autonomy i prioritized is invaluable to those within a patriarchal society. My stance is staunchly in oppositio critics who have condemned Austen’s work as anti-feminist. I argue through the use of essentia and constructionist theory that Austen, while still upholding certain traditional beliefs, helps arg for improved conditions for women within the parameters of a socially acceptable marriage by crafting a successful, nonconforming relationship in her novel “Persuasion.”

Weaponizing Femininity and Romance: Gender as a Performance and Compulsory Heterosexuality in The Hunger Games Trilogy

Presented by: Tatum Leary
Faculty Sponsor: Dr. Laura Witherington
Field of Research: English/Literature

Suzanne Collins's e Hunger Games Trilogy swept the nation when the rst novel was released i 2008 and again when the rst of four lms was released in 2012. is series features Katniss Ever as she ghts her way through the death match of " e Hunger Games," the rough political climate of "Catching Fire," and the warfare of "Mockingjay." I argue Katniss weaponizes femininity and heterosexuality through performing aspects of gender to survive and then overthrow an oppress government. Speci cally, I address the evolution of her performance across the trilogy. Katniss r from a dainty, little lovesick girl in " e Hunger Games," to a woman preparing for her wedding an being a mother in "Catching Fire," and nally to the face of the rebellion in "Mockingjay."

“Pride and Prejudice and Zombies”: The Unmentionable Parody Adaptation

Presented by: Gabbie Stokes
Faculty Sponsor: Dr. Cammie Sublette
Field of Research: English

Reviews of “Pride and Prejudice and Zombies” are mixed; while many in the academic world and those who are faithful fans of Jane Austen approach this adaptation with disdain, there exi another group of Austen fans who appreciate and look forward to any media that alludes to or inspiration from Austen’s world. Austen’s divided fanbase does not have much overlap with the zombie crazed fans of the apocalypse, so the ability for “Pride and Prejudice and Zombies” to c from all three groups shows the breadth of appeal that this adaptation has on fanbases and de Drawing from Henry Jenkin’s work on convergence culture and scholarly analyses of the respo of fans of Jane Austen to “Pride and Prejudice and Zombies,” this paper will discuss the in uen of convergence culture and fandom in the discourse surrounding the 2009 novel adaptation “P and Prejudice and Zombies” as well as its subsequent lm adaptation in relation to the delity th adaptations pay to the original text.

Health Science 121 Presentations in Accounting & Public Transportation

Noon Noah Ottman

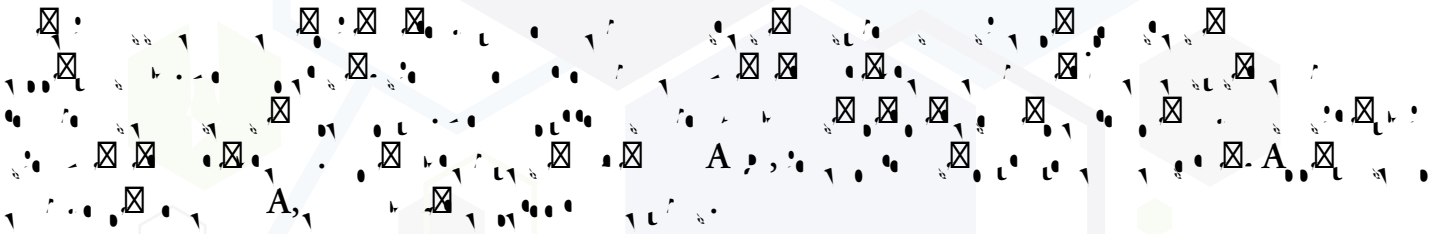
12:30 Joy Wootton

1:00 Dalton Oxford

The Current State of Corporate Social Responsibility

Presented by: Noah Ottman
Faculty Sponsor: Dr. Randall Stone
Field of Research: Accounting

is scholarly investigation analyzes the contemporary landscape of Corporate Social Responsi (CSR), a concept that obligates enterprises to uphold a heightened level of accountability transcending governmental mandates. CSR posits businesses not merely as entities functionir within society but as integral components thereof. Given the disparate regulatory frameworks established by diverse organizations and governmental bodies pertaining to CSR, this investig endeavors to dissect the manner in which distinct industries and nations navigate and adhere t CSR principles. is study undertakes a comparative analysis of CSR models to furnish a more nuanced understanding of the concept and its rami cations. Moreover, this inquiry adopts a hol perspective by examining CSR through the lens of both the stakeholder and corporate entities, a particular focus on Tesla, Inc.'s impact on stakeholders and the perspectives and implementa of CSR by nancial analysts and accountants. e conclusions drawn from this investigation underscore the exigency for further systematic inquiry into the subject matter, thereby advocati enhanced scholarly attention to the concept of CSR.



Accounting for Cryptocurrency by GAAP Standards

Health Science 124 Presentations in History, Political Science, & Costume Design

Noon Korina Lopez

12:30 Mitchell Collins

1:00 Gavin Garrett

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Civil War Prison Camps

Presented by: Korina Lopez

The Rise of Political and Social Distrust, Division, and Disenfranchisement in Modern Institutions

Presented by: Mitchell Collins

Cut, Curate, Costuming: A Costume Designer's Process

Presented by: Gavin Garrett
Faculty Sponsor: Dr. Elizabeth Momand
Field of Research: Costume Design

For centuries the costumes of theatrical productions have evolved from the simplicity of the Ancient Greek and Roman style to the exaggerated fashion of the Renaissance to the realistic st of contemporary and modern theatre. With the director's vision, the goal of a costume designer is to accurately portray the actor as their character in the correct time-period and within the given circumstances of the text. When costuming a show, a designer can take one of two routes: curat crafting. Crafting consists of designing patterns, choosing fabrics, and completing the constructio every garment, while curating is like a game of search and rescue for the perfect pieces.

My process as the costume designer for the UAFS Music and eatre production of "9 to 5: e Musical" has been one of curation. Following my director's vision, I have had to curate this sho by searching through our costume shop, thrifting pieces that t into the 1970s style, as well as pieces that support the fantasy section of the musical. With a cast of 22 people and each perso having more than one costume, this task has proven to be a challenging, yet rewarding experie

Health Science 133 Presentations in Chemistry, Biochemistry, & Latino Studies

Noon	Khuong (Peter) Ta
12:30	Lyndsie Hicks
1:00	Marlene Toledo
1:30	Daniela Morales Hernandez

Investigating the Interaction of Human Serum Albumin with Organochlorine Pesticides: A Case of Dynamic vs Static Quenching

Presented by: Lyndsie Hicks (co-researcher Luke Jodoin)
Faculty Sponsors: Dr. Rahul Yadav and Dr. Archana Mishra
Field of Research: Biochemistry

La educación de hogar como fuerza sin fronteras / Homeschooling as a Force Without Borders

Presented by: Marlene Toledo
Faculty Sponsor: Dr. Mary Sobhani
Field of Research: Latino Studies

Las familias hispanas en Estados Unidos, particularmente inmigrantes recién llegados, tienen el saber de sus opciones para la educación y crianza de sus hijos. Estar bien informados capacita familia a tomar el mejor rumbo de aprendizaje para las necesidades de esa familia. A pesar de hay un crecimiento de familias eligiendo la educación en hogar -- ya que permite moldear un pla estudio que de otra forma no reciben en las escuelas publicas -- existe una falta de familias hisp las comunidades de educación de hogar. Este trabajo de investigación argumenta que esto se gran parte a la falta de información y recursos para esta población hispano-hablante. La educac hogar fortalece los lazos entre la relación de padres e hijos lo cual puede contribuir positivament sociedad y promover el bienestar y desarrollo económico de nuestras comunidades.

Hispanic families in the United States, particularly immigrant families who have just arrived to thi nation, have the right to know all their options for the education and upbringing of their children. Possessing information on educational options equips each family to decide the best path of lear for its needs. Although there is an increase in the number of families choosing homeschooling -- it allows parents to customize a curriculum that their children might not otherwise receive in publ schools -- there is a lack of Hispanic families in homeschool communities. is study argues that this is due in part to the lack of information and resources available for this population. Homesch education strengthens ties between parents and children which can contribute positively to socie promote well-being and economic development in our communities.

Molecular Dynamics Study of Organochlorine Ligand Interaction with Human Serum Albumin

Presented by: Sully Sanford
Faculty Sponsor: Dr. Archana Mishra
Field of Research: Chemistry
Table 1

is study aimed to understand the binding properties between organochlorine pesticides and the most abundant serum albumin, human serum albumin (HSA). HSA is a carrier/reservoir for vario endogenous biomolecules such as steroids, fatty acids, bilirubin, and vitamins. HSA can also rea bind to many small molecules circulating in the blood, a ecting the pharmacokinetics/ADME of th molecules. HSA is a 66 kDa monomeric, multidomain (domains I, II, and III) protein characterize by two main ligand binding sites, Sudlow I and II.

Here, we have determined the molecular interaction of an organochlorine class of herbicide and insecticide, quinclorac (QUC) and 4,4 dichlorodiphenyldichloroethane (4,4-DDD), with HSA using molecular docking and simulation. ese organochlorines have high toxicity (low LD50) and long half-life and can remain in soil, water, and organisms for an extended time. Here, we study the bi of these two pesticides with HAS at Sudlow I based on the experimental ndings using uorescen ese pesticides were also chosen because of their di ering molecular properties.

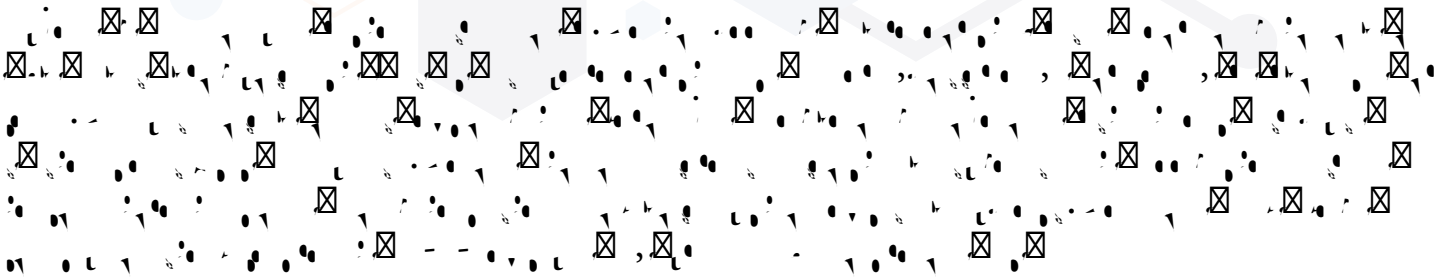
Molecular docking was rst performed to determine the pesticide's binding a nity for the ligand-binding site, Sudlow I0t (w 1epln in sIoc) sD), witpr.Schrodinger Maestro. Further, molecular dyna simulations (MD) of HSA with and without pesticide in the binding p),et were performed using GROMACS and CHARMM forcesIocesults obtained from the docking and MD simulation study show the structural characteristics of two molecularly di erent pesticides that interact with t Sudlow-I binding site of HSA.

Investigating Galectin Glycoprotein Interaction with Sialoglycans and Nanoparticles

Presented by: Luke Jodoin (co-researcher Lyndsie Hicks)
Faculty Sponsors: Dr. Rahul Yadav and Dr. Archan Mishra
Field of Research: Biochemistry
Table 2

Mammalian cells carry various surface glycoproteins important for regulating cellular processes s as inter/intracellular signaling, cytoskeletal remodeling, cell-cell recognition, and adhesion. Galec are one such class of lectin glycoproteins that bind to surface glycan, to which sialic acid is often terminal glycan (sialoglycan). Lectins, including galectins, can recognize and bind various cis-/tra sialoglycans to activate/inhibit signaling pathways. Studies have shown altered glycosylation in tu cells compared to normal cells, which could be utilized to detect cancer-speci c glycans and earl detection of tumor progression. is study aims to determine (1) glycan recognition and selective binding to lectins (galectin and bacterial lectin) and (2) Make a lectin and nanoparticle probe for selective recognition of glycans.

In the rst aim, we have utilized Schrodinger induced t docking to study the selective binding of lectins with various sialic acid glycans (N-acetylneuraminic acid, N-glycolylneuraminic acid, N-acetylneuraminic acid– Z(2,3)–galactose, N-acetylneuraminic– Z(2,6)–galactose, N-acetylneu acid– Z(2,6)–N-acetylgalactosamine, and N-acetylneuraminic acid– Z(2,8)–N-acetylneuraminic a In aim two, we have determined the absorption of human galectin-3 and bacterial lectin onto bar (20 nm) and serum-coated gold nanoparticles using the surface plasmon resonance phenomeno results show a red shift in the SPR signal of gold nanoparticles, indicating protein adsorption to t bare and serum-coated nanoparticles. In conclusion, our initial results show that lectin-nanoparti can be developed as a probe to detect speci c sialoglycans.



Phylogenetic Analysis and Molecular Adaptation Events in Whales and Dolphins

Presented by: Armonii Dixon and Kiara Thomas
Faculty Sponsor: Dr. David McClellan
Field of Research: Evolutionary Biology
Table 3

is poster presentation showcases the comprehensive methodology employed to investigate the evolutionary dynamics within whales and dolphins through molecular analysis of the cytochrome oxidase subunit 1 (COI) and cytochrome b (cyt-b) full protein-coding mitochondrial gene sequenc e study involved assembling a robust dataset from the GenBank database (https://www.ncbi.nlm nih.gov/genbank/), utilizing the Molecular Evolutionary Genetics Analysis (MEGA) software versi 11 (Stecher, Tamura, and Kumar, 2020). Sequences were aligned using the Clustal W algorithm (Larkin et al., 2007) within MEGA to ensure accuracy, consistency, and homology. Phylogenetic reconstruction was performed using MEGA with the Maximum Likelihood optimality criterion, enabling the elucidation of evolutionary relationships among the diverse species of whales and dolphins. is approach provides insights into the genetic divergence and evolutionary history of the COI and cyt-b gene sequences. Furthermore, the resulting phylogenetic tree structure serve a foundation for estimating the timing of molecular adaptation events in COI and cyt-b since the divergence of cetaceans from the other Cetartiodactyla. e TreeSAAP software package (Woolley et al., 2003) facilitated this analysis, allowing for the identi cation and characterization of adaptive changes in the protein-coding regions of these genes. rough this interdisciplinary approach combining bioinformatics tools and evolutionary genetics principles, our study contributes to a de understanding of the evolutionary processes shaping the genetic diversity and adaptation in curr marine mammal populations.

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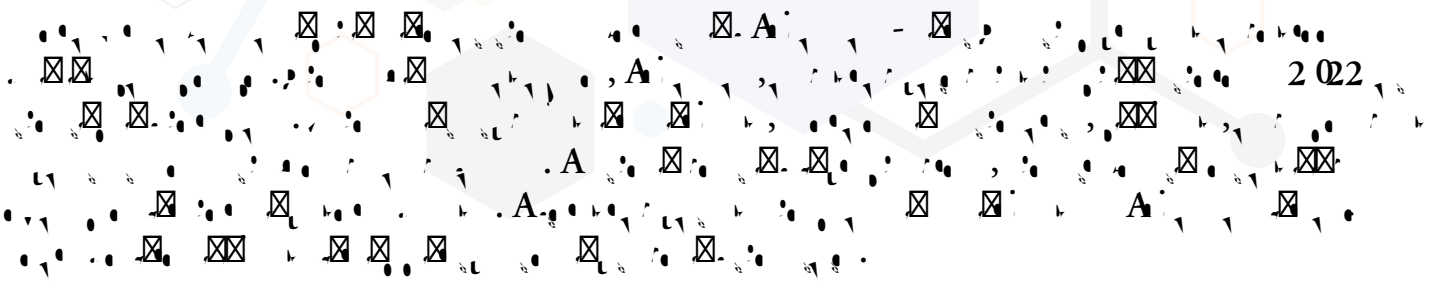
cyt-b Gene Sequences

Presented by: Ciera Grijalva
Faculty Sponsor: Dr. David McClellan
Field of Research: Evolutionary Biology
Table 4

is poster presentation presents a methodical exploration of the evolutionary dynamics within jelly sh (Phylum Cnidaria), focusing on the molecular analysis of cytochrome oxidase subunit 1 (COI) and cytochrome b (cyt-b) full protein-coding mitochondrial gene sequences. e study involved the meticulous compilation of an appropriate dataset sourced from the GenBank databa (https://www.ncbi.nlm.nih.gov/genbank/), facilitated by the utilization of Molecular Evolutionary Genetics Analysis (MEGA) software version 11 (Stecher, Tamura, and Kumar, 2020). Sequences meticulously aligned using the Clustal W algorithm (Larkin et al., 2007) within MEGA to accurate ensure homology. Phylogenetic reconstruction was carried out employing the Maximum Likeliho optimality criterion within MEGA, thereby unveiling the intricate evolutionary relationships among selected jelly sh species. is approach o ers valuable insights into the genetic di erentiation and evolutionary trajectories within this enigmatic marine taxon. Furthermore, the resulting phylogene framework served as a cornerstone for estimating the temporal occurrence of molecular adaptat events in COI and cyt-b. Leveraging the capabilities of the TreeSAAP software package (Woolley 2003), our analysis unveiled signi cant adaptive changes within the protein-coding regions of the genes. rough combining advanced bioinformatics tools with fundamental principles of evolutiona genetics, this interdisciplinary investigation sheds light on the evolutionary mechanisms governin genetic diversity and adaptation in extant jelly sh populations.



Exploring Evolutionary Dynamics in Old-World Mice and Rats: A Molecular Analysis of COI and cyt-b Gene Sequences

Presented by: Laney Wagner

Land-use and Diffuse Pollution: A Look at Jack Nolan Lake in Greenwood, Arkansas

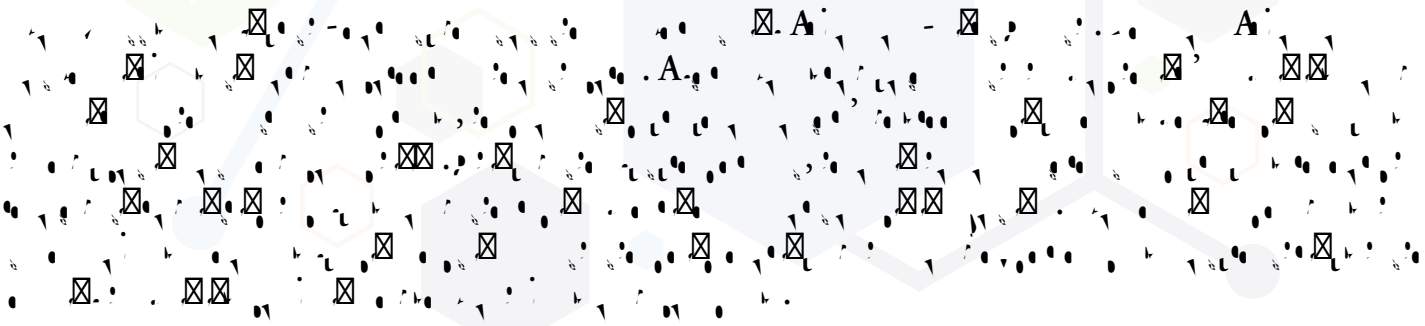
Presented by: Analise Black, Anna Carden, and Noah Tawney
Faculty Sponsor: James Brandli
Field of Research: Biology
Table 7

With increased population comes increased infrastructure such as industry, agriculture, and residential dwellings. Each of these land-use activities have the potential to make pollution wo including pollution caused by land-use due to runo . It is understood that land-use directly imp water quality in some way. is study aims to understand the impacts of land-use on Jack Nolan Lake in Greenwood, Arkansas and to improve the decision-making associated with land-use c During this project, water samples will be taken and analyzed for Phosphate, Nitrate, COD, Turbidity, herbicide, E. Coil, coliforms, and PH levels at deferent depths. e information gained through this study will be used to help develop in the future a forecasting AI to predict land-us stream from bodies of water.

Exploring Genetic and Environmental Factors that Control Differentiation of Pseudoplasmodium in Dictyostelium discoideum

Presented by: Evan Wittig
Faculty Sponsor: Dr. Sandhya Baviskar
Field of Research: Cell and Developmental Biology
Table 8

One of the multicellular stages during Dictyostelium development life cycle is the pseudoplasmodium stage, also known as the slug stage, which is formed at 14 to 16 hours of development. A slug is a 1-2 mm long tubular structure consisting of di erentiated cells. A slu looks relatively undi erentiated but contains several cell types such as anterior pre-stalk cells, posterior pre-spore cells, and in the posterior region, anterior-like cells. We conducted experin to explore if slug cells can undergo dedi erentiation and found that di erentiated cells of slug in the presence of food source, either bacteria or nutrient medium, undergo dedi erentiation but not in presence of non-nutrient medium like phosphate development bu er. ese ndings have prompted us to explore the expression of developmentally regulated genes and role of environment factors in dedi erentiation of slug cells. Using RT-PCR technique, the expression of two developmentally regulated genes: ecmA and pspA will be studied in dedi erentiated cel because their expressions are required to form a slug. We will explore if there is any relation b expression of developmentally regulated genes and environmental factors such as light, temp and humidity.



Distribution of Detrital Sediment Captured in McKay Bay Member Knoll Reef, Upper Peninsula, Michigan

Presented by: Kaleb McLaughlin
Faculty Sponsor: Dr. Maurice Testa
Field of Research: Geoscience
Table 9

e reef systems of the Michigan Basin have been investigated since the 1930's. However, little resea has been conducted on its knoll reefs that exist in outcrop. Knoll reefs are carbonate mounds that fo in shallow waters, which hamper the reef's ability to grow vertically, forcing the reef to grow horizont instead. e knoll reefs in this study are stracsrT 0 -i

X-Ray Diffraction and Petrographic Analysis of Magent Cove Carbonatite Core, Arkansas

Presented by: Emily Mero
Faculty Sponsors: Dr. Maurice Testa and Dr. Dave Mayo
Field of Research: Geoscience
Table 11

Geothermal activity such as hot springs are known to precipitate calcium carbonate (CaCO3) miner producing rocks such as tufa, travertine and sometimes associated with carbonatite. e precipitation CaCO3 is caused by the reduction of CO, which is less soluble in warmer waters. Geothermal heati water in natural springs drives this precipitation of CaCO3 in areas of Arkansas including Magnet C Magnet Cove, Arkansas is an alkalic igneous rock complex that is composed of a series of ring dike Mississippian in age. ese dikes have intruded into faulted and folded Paleozoic sedimentary rocks. of these igneous dikes is carbonatite, a rare carbonate-rich igneous rock. e formation of carbonatite remains unclear to this day. It may form from magmatic solutions, hydrothermal metasomatism, or a combination of both. If carbonatite is formed through hydrothermal metasomatism, then its likely for through repeated events of redeposition and recrystallization. On the other hand, if carbonatite is fo through magmatic means, then its parental magma must be some type of alkalic composition.

In this study, a carbonate-rich core sample was taken from Magnet Cove at the depth range of 10 fe 55 feet below ground. Five samples were processed for analysis at every 10 feet. Petrographic and Di raction (XRD) analysis was conducted on each sample to investigate the mineralogy and better understand the chemical alterations the area experienced.

A Benchtop Model of Piezometers Used to Determine the Vertical Flow of Groundwater

Pediatric Suicide Risk Associated with Social Media Use: A Literature Review

Presented by: Gracie Larru and Polly Hoang
Faculty Sponsors: Michele Elmore
Field of Research: Nursing
Table 14

Suicide is the second leading cause of death in children worldwide. e purpose of this study is to analyze previous studies on social media's e ects over suicide. In addition, suggestions for preventing combating this issue are mentioned throughout this paper. ere was no speci c method used to aid in search for previous research within this paper. Eleven studies were gathered, but only ten were used analysis and suggestions. Studies were selected from various countries to gain an international pers on social media and suicide. Social media mainly had an e ect on the mental health of children, spec on their risk for depression and anxiety which increases their risk for suicidal ideations. ere were sev commonly found themes such as dependency, desensitization, addiction, etc. Additionally, increased time on social media was found to increase the chances of suicide in the pediatric population. A majo contributor to suicide is cyberbullying including various challenges associated with cyberbullying such peer pressure and constant exposure. With that being said, there are several bene ts to limited socia use such as a sense of community and belonging. Some suggestions from previous research conclu education over social media use in family and healthcare providers is bene cial. Another suggestion is not recommended in this paper is to screen social media posts through arti cial intelligence (AI). is paper's recommendations based on previous research includes education, implementation of stricter and user control over social media content. Further research could be done to examine the cause an on the relationship of social media on suicide and early digital footprint. Longitudinal studies can be c on morefginrtu6nns based on pr
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Male-Oriented Recruiting, Job Satisfaction, and Retention Practices in Nursing

Presented by: Gerbert Floreschavez
Faculty Sponsors: Brooke Gray
Field of Research: Nursing
Table 15

Nurse sta ng levels are a signi cant issue, worsened by COVID-19. Insu cient sta ng means nurses face heavier workloads, less time with patients, and worse outcomes. High nurse-to-patient ratios ca cause mental health challenges and burnout, leading to higher turnover rates. Solutions include revis

The Evolution of Dental Radiology Safety

Presented by: Samantha Baughman, Jenny Kindle, and Parker Lemley
Faculty Sponsors: Roxy Reed
Field of Research: Dental Hygiene
Table 16

Since the discovery of the X-ray made by Wilhelm Roentgen in 1895 dental radiographs have underg signi cant advancements. Dental radiographs are crucial in helping to diagnose and treat various den conditions. Dental radiology safety has been a major topic of concern. e evolution of radiology safety shown many di erent stages. During the beginning many did not understand the e ects of radiation an did not use protection. With the help of updated technology, the amount of radiation a patient is expo to can be reduced and safety measures have been placed to the patient as well as the clinician. Now emission of radiation that is produced is said to be so low that certain protection such as a lead apron no longer needed. is research paper will provide a comprehensive review of how dental radiographs to be and their progression over time. As well as how safety measures have evolved with radiology p

Look Out Flouride, There's a New Amino Acid in Town!

Presented by: Dulce Guiterrez, Leslie Guerra, Amy Le, and Abigail Mussett
Faculty Sponsors: Roxy Reed
Field of Research: Dental Hygiene
Table 17

is paper aims to evaluate the e cacy of oral care products containing arginine, either alone or i combination with uoride, in comparison to uoride-only formulations with a focus on their ability to reduce the risk of dental caries. A comprehensive search was conducted across several dat for studies, trials, and reviews published in the last ve years regarding the use of arginine. Stu investigating the impact of arginine-containing oral care products on caries prevention, either a or in conjunction with uoride, were included. is paper identi ed a range of studies assessing th e ectiveness of arginine-containing products and uoride-only formulations in reducing caries ri While uoride has long been established as a cornerstone in caries prevention, recent attention turned to arginine and its potential role in fostering a neutral pH environment. e comparative e ectiveness of products containing arginine and uoride versus uoride alone remains a subjec of ongoing investigation. Preliminary ndings suggest a potential synergy between arginine and uoride in mitigating caries risk, with arginine contributing to an anvironment less conducive to acid-induced enamel demineralization. However, further well-designed clinical trials and long-te studies are needed to establish the comparative e cacy of these formulations. Dental professio should consider individual variations, adherence to oral care ptractices, and the presence of ot factors in providing personalized recommendtaions. is paper highlights the importance of ongo research to inform evidence-based approaches in optimizing oral care regimens for caries prev

Periodontal Tissue Regeneration

Presented by: Samantha Drain, Aracely Najera-Hernandez, Rudy Vasquez, and Gabriel Woody
Faculty Sponsors: Roxy Reed
Field of Research: Dental Hygiene
Table 18

Periodontal disease is a chronic condition that commonly a ects the general population. is dise is life-long and results in hard and soft tissue degradation over time if left uncontrolled. Among other things like oral jewelry, tissue trauma, and anatomical abnormalities, the loss of periodon hard and soft tissues is a major dental concern that dental professionals moderate regarding c health and aesthetic concerns for patients. is research analyzes and reviews di erent treatme options, concurrent and emerging, that aid the dental world in regenerating lost periodontal tis

Instrumental Music and You

Presented by: James Estrada
Faculty Sponsor: Dr. Alexandra Zacharella
Field of Research: Music Education, Music Outreach, Community Music
Table 20

All too often, individuals that are not classically trained in music will view the world of instrumen music at an angle of what “should have” and “could have been” rather than at an angle of what could become. ere are emphases that are placed on learning instruments at a young age; ther many terms in music that originate from several di erent languages; there are di erent systems musical notation that each come with their own challenges for a new learner; there are high co from owning and maintaining many of the single traditional classical instruments; there is a larg amount of time and dedication required to acquire technical mastery in many traditional classic instruments; there is a misalignment in interests that appears between the genres of music ass with traditional classical instruments and the genres that appear in modern pop-culture. Many challenges come in the way of people that want to become classically trained musicians or wa engage with the world of instrumental music beginning in adult life. Unfortunately, these individ sometimes never experience the pleasures of composing and performing with traditional class instruments. is presentation will delve into the psychology and circumstances that cause the

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Tatum Leary
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* Denotes rst-generation student