

# Celebrating Undergraduate Research, Artistry and Community Engagement

**Tuesday, April 30, 2024, 9 a.m. to 3 p.m.**  
**Holmes Student Center**



NORTHERN ILLINOIS UNIVERSITY

**Office of Student Engagement  
and Experiential Learning**

*Division of Academic Affairs*

# Letter from the President and the Executive Vice President and Provost

## Greetings!

At Northern Illinois University, we strive to provide all our undergraduate students with opportunities to engage in hands-on learning, both in and out of the classroom, to promote their academic and career success. The Conference on Undergraduate Research and Engagement is a celebration of our students' original intellectual and creative contributions to their disciplines.

The undergraduate students participating in this event have worked closely with talented members of NIU's faculty and staff to develop critical thinking skills, solve complex problems, and create new knowledge.

We commend their accomplishments as scholars, scientists, engineers, artists, and inventors. We recognize the role of undergraduate research and engagement for paving the way to life-long learning and informed and responsible citizenship.

Thank you for attending our students' presentations. Explore. Connect. Ask questions. Learn. And please join us in acknowledging the effort and accomplishments of both students and their mentors. NIU is grateful for your interest and support.



**President Lisa C. Freeman and  
Executive Vice President and Provost Laurie Elish-Piper**





The NIU Conference on  
Undergraduate Research and Engagement

## Table of Contents

|    |   |
|----|---|
| 2  | Letter from the President                                   |
| 4  | Event Staff and Committees                                  |
| 4  | CURE Partners   |
| 5  | Event Sponsors  |
| 6  | Schedule of Events  |
| 7  | Judges  |
| 9  | Dr. Arnold Hampel and<br>Dr. Denise Kennedy CURE Award Fund |
| 10 | Celebrating Research Mentors                                |
| 14 | Abstracts   |
| 14 | College of Business   |
| 17 | College of Education  |
| 22 | College of Engineering and<br>Engineering Technology        |
| 32 | College of Health and Human Sciences                        |
| 45 | College of Liberal Arts and Sciences                        |
| 88 | College of Visual and Performing Arts                       |
| 90 | Sycamore High School  |



NORTHERN ILLINOIS UNIVERSITY

**Office of Student Engagement  
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# Event Staff and Committees

# CURE Partners

**Outreach and Faculty Engagement:**

Andrea Radasanu, Honors Director, and Assistant Vice Provost for Student Enhancement

**Conference Coordinator:**

Emily Reilly, Associate Director, Office of Student Engagement and Experiential Learning

**Conference Assistant:**

Makyla Charles, Graduate Assistant, Office of Student Engagement and Experiential Learning

**Logistics:**

April Buckley, Administrative Aide, Honors Program and Office of Student Engagement and Experiential Learning

**Undergraduate Research****Ambassadors:**

Hannah Havel  
Merveille Muyizere  
Will Parker  
Anna Scanlan  
Henry Tomiser  
Yaileen Velazquez

Division of Enrollment Management, Marketing and Communications

Holmes Student Center

Honors Program

NIU Alumni Association

NIU Foundation

Office of the President

Office of the Provost

University Libraries





## Event Sponsors





# Schedule of Events

All CURE activities will be held at the Holmes Student Center.

## Presenter/Judge Check-in

Presenter and judge check-in is from 8:15 a.m. through 1:45 p.m. in the Duke Ellington Ballroom. All presenters and judges should arrive at least 15 minutes prior to their assigned session to sign in. Presenters are assigned to one time slot, but posters will be available for viewing the entire event.

## Poster Sessions

|                 |               |
|-----------------|---------------|
| 8:15 a.m.       | Sign-in Opens |
| 9 to 10 a.m.    | Session I     |
| 10 to 11 a.m.   | Session II    |
| 11 a.m. to noon | Session III   |
| 1 to 2 p.m.     | Session IV    |
| 2 to 3 p.m.     | Session V     |



## NIU Career Services Career Corner

Loved doing undergraduate research? Let's chat about your research journey. Let's get you talking about it and help you gain confidence in sharing your research accomplishments with future employers or grad schools.

NIU Career Services and NIU alumni will be hanging out in the Career Corner to help you reflect on the skills you've gained and practice interview answers. There will be a photo op too.

Stop by the Career Corner from 9:30 a.m. to 3:15 p.m.



NORTHERN ILLINOIS UNIVERSITY

**Career Services**

*Division of Academic Affairs*



## Judges

Natalie Andzik, Special and Early Education  
 Abul Azad, Engineering Technology  
 Stephanie Baker, Special and Early Education  
 Sheila Barrett, Health Studies  
 Shannon Becker, World Languages and Cultures  
 Akosua Birago Poku, Educational Technology, Research and Assessment  
 M.J. Blaschak, Allied Health and Communicative Disorders  
 Melissa Burlingame, Environmental Studies  
 Arielle Cassiday, Political Science  
 Yessenia Chavez, Neuroscience and Behavior  
 Shicheng Chen, Health Studies  
 W. Catherine Cheung, Allied Health and Communicative Disorders  
 Peter Chomentowski, Kinesiology and Physical Education  
 Wonock Chung, Kinesiology and Physical Education  
 Gibson Cima, Theatre and Dance  
 Finley Cowlshaw, Art History  
 Apoorva Dabholkar, Biological Sciences  
 Purushothaman Damodaran, Industrial and Systems Engineering  
 Amy Daniel, Nursing  
 Alisha Diggs, Biomedical Engineering  
 Mary Lynn Doherty, Music  
 Alissa Droog, Research and Instruction  
 Dr. T. Ajewole Duckett, Center for Black Studies  
 Amanda Durik, Psychology  
 Melissa Fickling, Counseling and Higher Education  
 Larissa Garcia, University Libraries  
 Kim Gatz, Communication  
 Rachel Gordon, Health Studies  
 Scot Grayburn, Biological Sciences  
 Liping Guo, Engineering Technology  
 Arnold Hampel, Biochemistry Professor Emeritus  
 Kendall Hampton, Public Administration  
 Anne Hanley, History  
 Michael Henson, Biological Sciences  
 A S M Shahadat Hossain, Computer Science  
 Pi-Sui Hsu, Educational Technology, Research and Assessment  
 Aliyan Rizwan Hussain, Accounting  
 Farah Ishaq, Kinesiology and Physical Education  
 Darius Jackson, Center for Latino and Latin American Studies  
 Priyanka Jha, Counseling and Higher Education  
 Dorcas Joseph, Physics  
 Stacy Kelly, Special and Early Education  
 Colin Kuehl, Political Science and Environmental Studies  
 Michael Kushnick, Allied Health and Communicative Disorders  
 Xiaohui (Sophie) Li, School of Family and Consumer Sciences





## Judges (Continued.)

Lisa Liberty, Special and Early Education  
Amanda Littauer, Center for the Study of Women, Gender and Sexuality, History  
William Martin, Biological Sciences  
Miftahul Jannat Mokarrama, Computer Science  
Christine Mooney, Management  
Joey Moore, Center for Nonprofit and NGO Studies  
Nina Mounts, Psychology  
Irina Nesterova, Chemistry and Biochemistry  
Praise Oguntokun  
Janet Olson, Allied Health and Communicative Disorders  
Brandon Perez, Special and Early Education  
Dee Anna Phares, University Libraries  
Nicholas Pohlman, Mechanical Engineering  
Nancy Prange, Health Studies  
Charles Pudrith, Allied Health and Communicative Disorders  
Bethan Rohl, Kinesiology and Physical Education  
Rachel Rupnow, Mathematical Sciences  
Michelle Sands, Special and Early Education  
Anitha Saravanan, Nursing  
Alicia Schatteman, Office of the Provost  
Robert Schneider, Theatre and Dance  
Scot Schraufnagel, Political Science  
Mark Schuller, Anthropology and Nonprofit and NGO Studies  
Sharif Shahadat  
Kimberly Shotick, Research and Instruction  
Pallavi Singh, Biological Sciences  
Thomas Skuzinski, Environmental Studies / Public Administration  
Stephanie Smelser, Rehabilitation Counseling  
Trevon Smith, Counseling and Higher Education  
Gretchen Sprinkle, Special and Early Education  
Matt Streb, Political Science  
Janek Sunga, Political Science  
Wesley Swingley, Biological Sciences  
Abdul Rabbani Syed, Computer science  
Sai Prathyusha Tavva, Computer Science  
Leanne VandeCreek, University Libraries  
Kaela Villafania, Physics  
Patty Wallace, Psychology  
Joseph Wasiqi, Mathematical Sciences  
Katja Wiemer, Psychology  
Bradley Wiles, University Libraries  
Roland Winkler, Physics  
Linda Yasui, Biological Sciences  
Donald Zinger, Electrical Engineering

# Dr. Arnold Hampel and Dr. Denise Kennedy CURE Award Fund



The Office of Student Engagement and Experiential Learning is grateful for the contributions of Arnold Kennedy and Denise Hampel in making the Conference on Undergraduate Research and Engagement (CURE) an exciting annual event.

Students receiving high rankings on their presentation will receive monetary awards and the opportunity to have their posters published in Huskie Commons, thanks to \$5,000 contributed annually by the Dr. Arnold Hampel and Dr. Denise Kennedy CURE Award Fund.

Kennedy and Hampel were professors and research scientists at NIU. A major part of their interests included introducing students to research and watching them blossom. They genuinely enjoyed seeing the enthusiasm of students learning, understanding and creating.

Kennedy earned her bachelor's degree and master's degree from NIU, before earning a graduate respiratory therapist degree from Northwestern University Medical School. Her allied healthcare career began at the bedside as a patient caregiver. Most recently she was a clinical professor in the College of Health Solutions at Arizona State University. She was loved by her students and instrumental in helping many of them launch successful careers.

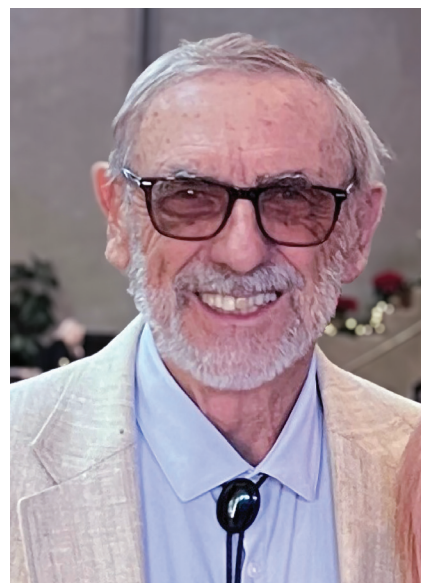
Kennedy passed away in 2023, but her remarkable legacy centers around her life's dedication to healthcare and to helping others. Through her generous legacy gift, this namesake fund serves as a fitting tribute to her longstanding commitment to NIU and its students.

Hampel earned his bachelor's degree from NIU, then went on to obtain his Ph.D. in biochemistry from the University of Wisconsin — Madison. Ultimately, he returned to NIU to teach. He holds 15 scientific patents and has published 80 scientific publications.

Upon his retirement, Hampel received the distinction of emeritus professor in both the Department of Chemistry and Biochemistry and the Department of Biological Sciences at NIU. Perhaps what marked his career the most was his incredible love for teaching and for academically inspiring youth.



Denise Kennedy.



Arnold Hampel.

# Celebrating Our Research Mentors

## 2024 CURE Faculty Mentor of the Year

The purpose of this student nominated award is to show appreciation and provide recognition to exemplary faculty who provide undergraduate students access to research experiences and embody exceptional mentorship practices that help students reach their academic and career goals.



**Allison Gladfelter, associate professor,  
Allied Health and Communicative Disorders**

Allison Gladfelter's passion, knowledge, ability to connect with students, and encouragement of students are characteristics and practices that have made a positive impact not only on a Research Rookie this year, but on many students in previous years. Research Rookie, Zoey Proper shared: "Even though we are from different departments, she has been great at relating to my future career as a physical therapist. She is extremely passionate about autism and neurodiversity which has allowed me to develop a passion for advocacy."

## 2023 CURE Faculty Mentors of the Year



**Katja Wiemer,  
associate professor,  
Cognitive and  
Instructional Psychology**



**Jennifer Koop,  
assistant professor,  
Biological Sciences**



# Celebrating Our Research Mentors (Continued.)



**Aleena Kallan**  
**Biology**  
**Pallavi Singh**

"Dr. Singh offered me the chance to join her research lab during my freshman year, and I couldn't have been more fortunate. From the beginning, she made me feel welcomed and has consistently provided encouragement in this unfamiliar environment. A year later, I am now confident in leading projects in the lab, and I continually receive support from Dr. Singh for both my academic and personal endeavors."

**Alia Moran**  
**Anthropology and Art History**  
**Kanjana Thepboriruk**

"I want to thank Dr. Thepboriruk for reigniting my love for research the many times I had my doubts. Not only is she a great research mentor, she is a great individual to look up to in many ways."

**Aidan Bengford**  
**Political Science, English**  
**Natalie Andzik**

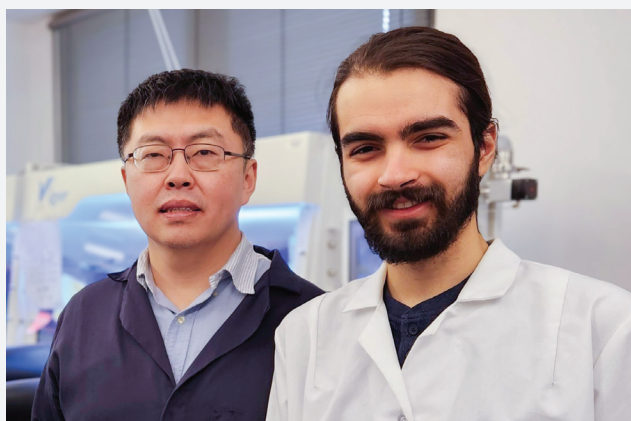
"Dr. Andzik kept me on track and made submit work in a timely manner. She taught me how much I could handle in a project and how to reach and surpass those limitations."

**Diana Alvarez**  
**Computer Science**  
**Melissa Clucas Walter**

"I am sincerely thankful to Dr. Clucas Walter for her outstanding support and flexibility. Her encouragement in allowing me to pursue interests outside my major, coupled with her readiness to teach me in-depth about these subjects, has greatly enriched my academic experience."

**Emma Whitlock**  
**Biology and Environmental Studies**  
**Linda Yasui**

"I am incredibly grateful to be a part of Dr. Yasui's cancer biology lab as she has a vast knowledge in the field of cancer biology and supports students' understanding of their research in any way that she can. Dr. Yasui pushes me to learn more and apply what I have learned in my classes to the research process. I am filled with gratitude to be learning under her guidance, and to be completing my Honors Capstone based on the research I complete with her."



**Emanuel Naumann**  
**Department of Chemistry and Biochemistry**  
**Tao Li**

"Working in Dr. Li's research group has been extremely insightful to developing research experience and growing more independent as an aspiring chemist. I am extremely grateful for the opportunities he has offered me in his group, and I am excited to gain further experience as I develop myself academically and pursue an internship opportunity in his group during the upcoming summer."

# Celebrating Our Research Mentors (Continued.)



**Yaileen Velazquez**  
**Biological Sciences**  
**Heather Bergan-Roller**

"Dr. Bergan-Roller has helped me immensely in paving my path in undergraduate research. I am incredibly appreciative and grateful for Dr. Bergan-Roller's dedication, patience, and commitment."

**Sydney Kuhn**  
**Psychology**  
**Leslie Matuszewich**

"Dr. Matuszewich has been such an amazing mentor! She is so flexible and kind, she genuinely cares so much about her research and the students she works with, and she has made this entire process so enjoyable."

**Sydney Fields**  
**Biology and Psychology**  
**Angela Grippo**

"Dr. Grippo has opened my eyes to the world of research, and allowed me such an amazing opportunity to learn alongside her other graduate and undergraduate students. She's given me the chance to understand how research is done, and provides the place to practice my research skills with her mentorship. "

**Emma Walsh**  
**Finance**  
**Matthew Benning**

"Instructor Benning has helped make a difference in my Capstone process by being a supportive mentor and encouraging me throughout my project. I have appreciated his guidance throughout this semester and am thankful to have had him as a professor!"



**Henry Tomiser**  
**Psychology**  
**Allison Gladfelter**

"I am incredibly grateful for Dr. Gladfelter's mentorship because she continues to believe in my skills and push me to try for new opportunities. Without her encouragement, I would probably not have run for a student leadership position or presented at a national conference, and I wouldn't have gained the amazing experiences that came along with these opportunities. Thank you Dr. G!"



# Celebrating Our Research Mentors (Continued.)

**Henry Tomiser**  
**Psychology**  
**Katja Wiemer**

"I am so grateful to have had Dr. Katja Wiemer as a mentor for my Honors Capstone. Dr. K always goes above and beyond to communicate with her students and make sure we have all the resources we need. She is always invested in her student's success, and she is intent on seeing us grow as researchers and as people. Thank you Dr. K!"

**Mikayla Dirksen**  
**Biomedical Engineering**  
**Jifu Tan**

"Special thanks to my mentor, Dr. Tan, for his guidance, patience, and encouragement. I am grateful for the opportunity to expand my skillset and learn about something that was previously out of my comfort zone. "

**Jazmin Hollingsworth**  
**Middle Level English Teaching**  
**Zoe Cassady**

"Thank you Instructor Cassady for being the absolute best! Words cannot describe how much gratitude I have for you!"

**Rhea Johnson**  
**Nursing**  
**Anitha Saravanan**

"I am grateful Dr. Saravanan has taught me so much about the field of research and how I am able to learn so much more about nursing and how diverse the field is. I always believed nursing was a field that required direct patient care at almost all times and that research was only done in a lab setting without the direct patient experience. Since learning how research is able to help patients in different setting, I feel more inclined to do more in the field!"

**Emma Bell**  
**Anthropology**  
**Dana Bardolph**

"Dr. Bardolph has showed me how to traverse research as a thoughtful, smart, hard-working female scientist. She is always there if I need her for advice, academically or personally. Thank you Dana!"

**Anahied Rayzian**  
**Public Health**  
**Bill Martin**

"Dr. Martin allowed us the autonomy to develop, and test our own hypothesis in regard to student engagement in STEM- thanks Dr. Martin!"

**Elizabeth Nowak**  
**Anthropology and Theatre Studies**  
**Jessica Cima**

"As my mentor, Jessica Cima has provided an immense amount of support and assistance. Thank you for helping me grow."



**Sameera Sanders**  
**Nursing**  
**Anitha Saravanan**

"Dr. Saravanan is an excellent faculty mentor, as she continually demonstrates how dedicated she is to research and she shows how important research is especially in the field of Nursing. Through the mentorship of Dr. Anitha Saravanan and having the honor of being her undergraduate research assistant, my communication skills with the older adult community, my analysis of data, and critical thinking skills have all enhanced."



# College of Business



**Impact Investing**

*Presenter(s): Charles Belt*

*Faculty Mentor(s): Christine Mooney*

*Session Time: 1 to 2p.m. Poster #140*

*Research Rookie*

A new approach to investing, impacting investing, is gaining momentum as investors seek to align their financial goals with social and environmental objectives. This paper explores the concept, evolution, and potential of impact investing in driving positive change. By investing capital towards businesses and projects that generate social impact alongside financial returns, impact investing offers a unique way to address social and environmental challenges. Drawing from literature and case studies, this study goes into the motivations and frameworks employed in impact investing, highlighting its effectiveness in producing sustainable and inclusive growth. Moreover, it examines the role of various investors, businesses, and society at large, in shaping the landscape of impact investing. By showcasing successful initiatives and addressing key challenges, this literature review underscores the significance of impact investing as a means for social and economic change.

**AlertDrive Pro**

*Presenter(s): Nikhil Doddaga and Katie Erdmann*

*Faculty Mentor(s): Federico Bassetti*

*Session Time: 11 to noon Poster #138*

This project focuses on AlertDrive Pro, an advanced safety mechanism that integrates three critical features: Drowsy Driver Detection, Hands-on-Wheel Detection, and Seat Belt Detection. Drowsy Drive Detection automatically initiates a wake-up call to the driver's phone. Hands-on-Wheel Detection initiates a phone call alert if no hand is detected on the wheel. Seat Belt Detection senses whether the seat belt is properly fastened across the driver's chest, addressing the issue of drivers bypassing the seat belt alarm by improperly securing the belt. Calls persist until the driver responds, ensuring that their attention is redirected to the task of driving safely.

**Northern Illinois University Huskie Marching Band Stoles**

*Presenter(s): Emma Walsh*

*Faculty Mentor(s): Matthew Benning*

*Session Time: 2 to 3p.m. Poster #136*

*Honors Capstone*

The Northern Illinois University Huskie Marching Band plays a huge role on campus and in the NIU community supporting NIU athletics and entertaining audiences throughout the university and surrounding area. Known as "The Pride of the Midwest," the Huskie Marching Band has enriched the Huskie spirits of students, faculty, parents, alumni, and the Huskie community. The dedication and persistence these students demonstrate each day at rehearsals, games, and events is something that does not go unnoticed. Therefore, it is important for these students to receive graduation recognition with stoles

to wear at their ceremonies as a sign of their commitment to the program and their university. The graduation stoles project is significant to the Huskie Marching Band and NIU as it is a way for students to showcase their musical accomplishments and reflect on their time in the Huskie Marching Band.

### **Refueling the Accounting Pipeline**

*Presenter(s): Crystal Wong*

*Faculty Mentor(s): Candice Hux*

*Session Time: 1 to 2p.m. Poster #137*

*Honors Capstone*

The number of college students majoring in accounting has significantly decreased, which also decreases the number of new accountants entering the industry. The objective of this research is to identify the potential methods that can be implemented to attract more students to major in accountancy and to contribute insights that may be useful in solving the accounting pipeline issue. Over 200 students in NIU's College of Business have responded to an anonymous and tailored survey to understand why students choose a particular business major and their perception of a career in the accounting profession. A key finding of this research is that the versatility of an accounting degree needs to be emphasized to students before they choose their college major in order to improve the accounting pipeline. The goal of this research is to identify factors that attract more students to major in accounting.

### **Building A Business: A Close-Knit Relationship Between Marketing & Entrepreneurship**

*Presenter(s): Gabrielle Ysteboe*

*Faculty Mentor(s): Jennifer Redisi*

*Session Time: 9 to 10a.m. Poster #139*

*Honors Capstone*

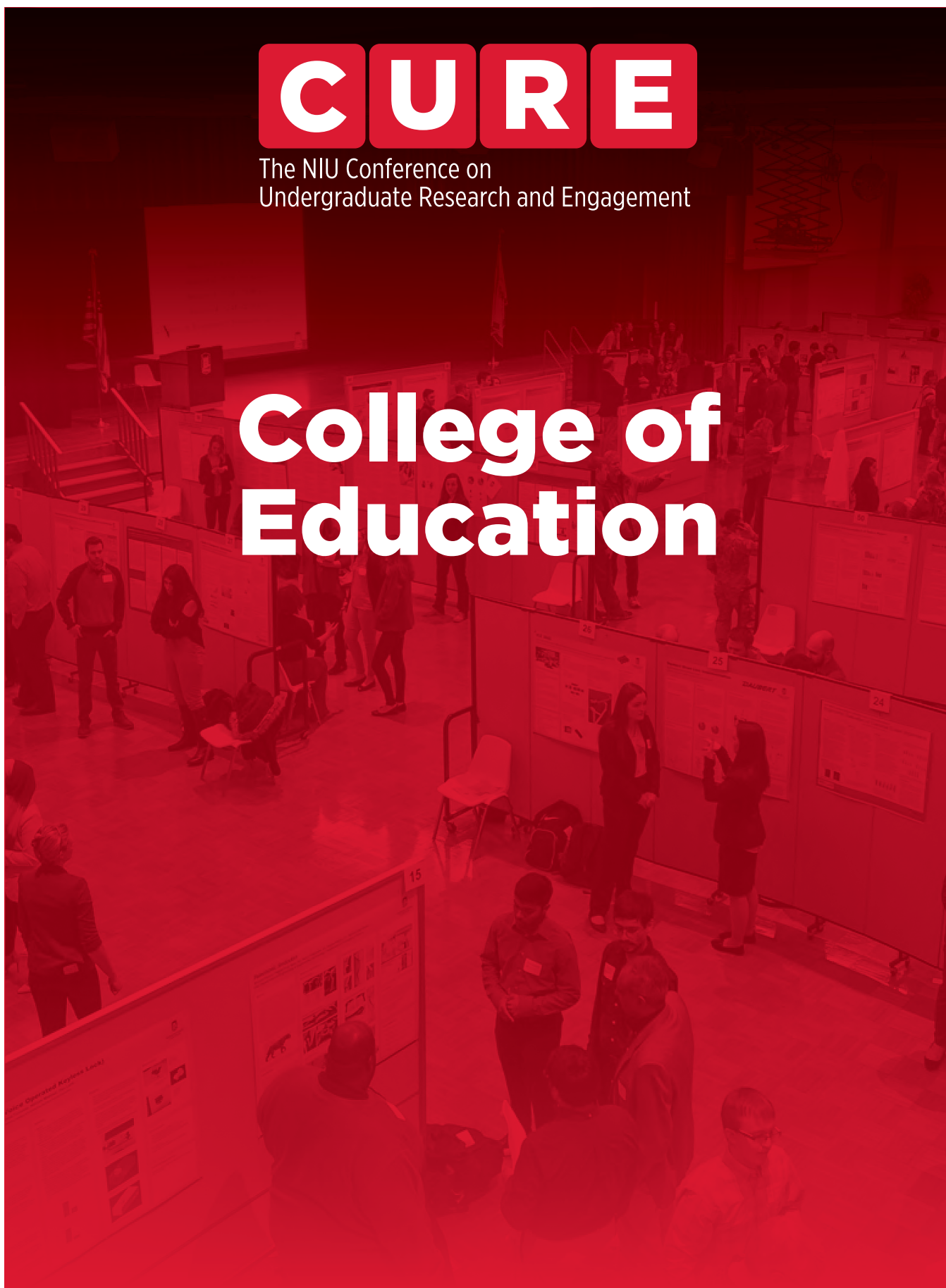
This project explores how best to market a knit blanket business with respect to several parameters including market research to determine price point; where to sell the product, with options including Etsy, brick and mortar, larger retail stores, personal website, craft fairs and pop-up retail locations; and determining target market and demographics, which will shape the marketing strategy as a whole.





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# College of Education



## **Eugenics and Intellectual Disabilities: A Historical Perspective**

*Presenter(s): Sofia Cruz Losada*

*Faculty Mentor(s): Natalie Andzik*

*Session Time: 11 to noon                      Poster #144*

*Research Rookie*

“Eugenics” encompasses historical practices aimed at improving the genetic quality of the human population, often involving coercive measures and discriminatory policies against individuals with intellectual disabilities. By examining the evolution of laws and societal attitudes, this research aims to shed light on the profound impact of eugenics on the lives of those with intellectual disabilities and the broader implications for ethical and inclusive legislation across seven countries. The research evaluates the progress made in dismantling discriminatory legislation (from the early to the late 20<sup>th</sup> century), which led to fostering a more inclusive and rights-based approach towards individuals with intellectual disabilities in the modern era. The findings aim to contribute to ongoing discourse surrounding the protection of human rights and the promotion of equality for all, regardless of cognitive abilities.

## **Toilet Training and Teaching Self Initiations to Children with Autism who use Augmentative and Alternative Communication**

*Presenter(s): Darcy Douglass*

*Faculty Mentor(s): Natalie Andzik and Brandon Perez*

*Session Time: 10 to 11a.m.                      Poster #141*

*Student Engagement Fund Recipient and Honors Capstone*

The project focuses on addressing the challenges faced by individuals with autism spectrum disorder (ASD) during toilet training, a process known to take longer for them than neurotypical children. In contrast to punitive methods commonly used, this project employs reinforcement-based procedures inspired by a study by Perez et al. (2020), where 11 out of 13 participants with ASD responded positively. This project stands out by simultaneously targeting urinary continence and self-initiation to use the bathroom, recognizing the unique difficulties faced by children with ASD. The methodology includes a treatment package incorporating underwear, differential reinforcement, and a 30-minute sit schedule, providing regular bathroom opportunities. The project explores least-to-most prompting to teach self-initiation, gradually decreasing intrusiveness. By diverging from traditional approaches, the project aims to enhance functional living skills, independence, and the overall quality of life for individuals with ASD by potentially reducing caregiver costs and environmental impact by minimizing diaper usage.

## **Past, Present, and Future: The Story of Asian American Studies at Northern Illinois University**

*Presenter(s): Jaeden Ellasus*

*Faculty Mentor(s): Jacqueline Mac*

*Session Time: 10 to 11a.m.                      Poster #145*

*Research, Engagement and Academic Diversity Grant*

The purpose of this project is to explore the needs and perceptions of the Asian American Certificate Program at Northern Illinois University (NIU). The main goals of this project are to find out how current and past Asian American students make sense of their experiences, as well as how they articulate the need for an Asian American studies program at NIU. The project also explores how NIU can support Asian American students, specifically those in the Asian American studies program. This exploration is conducted through interviews and archival research to understand the program's history and where it lies today. The project utilizes an extensive historical archive located in the NIU library. The results will be used to make improvements and suggestions to the program to help it grow.

### **Reinforcement Enhances Locomotor Memory but Not Learning in Healthy Older Adults**

*Presenter(s): Henriette Halwas*

*Faculty Mentor(s): Chris Hill*

*Session Time: 9 to 10 a.m.                      Poster #15*

Older adults' responses to reinforcement feedback in skill learning vary. Yet, diverse reinforcement valences haven't been explored in locomotor adaptation. For this experiment, 51 adult participants, 33 young (YA), 18 older (OA) were split into Reward, Punishment, and Sensory groups. They walked on a treadmill while receiving feedback from their knee flexion. After baseline walking, participants adapted to a new knee flexion pattern and performed a retention test. Percent adaptation achieved (PAA) was analyzed. Results showed that OA with Sensory feedback adapted and retained less than Reward and Punishment. Punishment enhanced memory in OAs during retention. YA showed better memory with Sensory feedback. YA showed decreased PAA from Adaptation to Retention with Punishment and Reward. Adaptation didn't differ between ages or groups. In conclusion, OA displayed stronger locomotor adaptation memories with reinforcement, possibly linked to age-related cortical changes like dopamine decline, suggesting altered neural pathways for locomotor memory in OA.

### **The Matthew Effect within Chicago**

*Presenter(s): Jazmin Hollingsworth*

*Faculty Mentor(s): Zoe Cassady*

*Session Time: 1 to 2p.m.                      Poster #143*  
*Honors Capstone*

This project highlights the significance of poverty as it affects students within Chicago Public Schools (CPS). Public schools receive less funding due to local property, replacement tax and Tax Increment Financing (TIF) surpluses. CPS also receives funding from other local sources such as philanthropic donations, interest income, lunchroom fees, and school rental fees. State income accounts for 23 percent of CPS revenue. Teachers are funded by allocated funding through the Illinois district Evidence-Based Funding (EBF). The state's EBF model allocates each year's funding through a tiering system that directs new investments within state education funding to districts most in need of resources. The Matthew Effect trickles down to the CPS school districts

based on lack of communal resources such as rehabilitation centers, grocery stores, community centers, gyms/fitness centers, police stations, hospitals, adequate education, nuclear families, lawyers, police officers, principals, teachers, administration from CPS to set a standard for children.

**GNBT Individuals' Experiences of Connection and Support in Extended Family:  
An Interactive Phenomenological Investigation**

*Presenter(s): Eli Huffman*

*Faculty Mentor(s): Melissa Fickling*

*Session Time: 11 to noon                      Poster #29*

*Research Rookies*

In this interactive phenomenological study, researchers explore the question: How do gender nonconforming, nonbinary, binary trans, and trans (GNBT) individuals understand, manage, and navigate extended family dynamics? GNBT individuals are more likely than their cisgender counterparts to experience mental health issues and lack of familial support. A protective measure against these issues is a strong social network, one that includes family. Current research has yet to explore extended family relationship dynamics from the perspectives of GNBT adults. Using a card sorting method and semi-structured interviews with five participants, we found that extended family does play a role in the experience of support that GNBT individuals feel. Furthermore, having or not having this support influences the kinds of stressors a GNBT individual reports in their life. Implications for professional counselors and researchers will be shared.

**Teaching Students with Autism Spectrum Disorder (ASD) to Independently  
Communicate with their Alternative Communication Systems (AAC)**

*Presenter(s): Courtney James*

*Faculty Mentor(s): Natalie Andzik and Brandon Perez*

*Session Time: 9 to 10 a.m.                      Poster #142*

*Honors Capstone and Student Engagement Fund Recipient*

This study explores the efficacy of teaching children with autism spectrum disorder (ASD) to independently communicate using augmentative and alternative communication (AAC) systems. AAC systems, such as high-tech speech-generating devices on iPads, have shown promise in enhancing communication skills among individuals with ASD. However, there is a gap in research regarding the effective training of paraeducators to facilitate the independent use of AAC by children with autism.



## **Culturally Responsive and Sustaining Teaching Practices to Support Students with Visual Impairments**

*Presenter(s): Genesis Miranda*

*Faculty Mentor(s): Molly Pasley*

*Session Time: 11 to noon*

*Poster #146*

*Honors Capstone*

There are many layers and factors that must be considered when teaching any student: their interests, strengths and areas of improvement, their culture, disability, etc. Each one of those factors is crucial for developing a sound and effective educational plan. The literature reviewed for this presentation reveals the great importance of culturally responsive and sustaining practices for all students, but how can these practices be individualized for students with visual impairments? This presentation examines the intersectionality of cultural backgrounds and visual impairments to provide educators with strategies to create inclusive environments that promote learning and empowerment.

## **The Effect of Reinforcement on Human Sense of Agency: A Preliminary Report**

*Presenter(s): Numa Samnani*

*Faculty Mentor(s): Chris Hill*

*Session Time: 10 to 11a.m.*

*Poster #17*

Sense of agency (SoA) is the perception of control of actions and consequences. A measure of SoA is intentional binding (IB), temporal perception of two events. Reinforcement is a powerful tool that shapes behavior however we don't understand how it changes SoA. This study investigates the how reinforcement feedback changes SoA by observing IB. For this study, 30 adults were assigned to one of three groups (Reward, Punishment, Neutral) and performed an active and passive interval estimation-paradigm, where the participant or researcher presses a key, triggering an auditory tone at one of three preset intervals. Afterward, participants estimated the time between the button press and sound. Judgement error (JE) was calculated as a measure of IB. Punishment increased IB across time intervals compared to Reward and Neutral. Punishment may be used to enhance SoA in neurological diseases, where a loss of SoA is a symptom.



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# College of Engineering and Engineering Technology

### **Electrical Detection of pH Changes in Bioseng**

*Presenter(s): Austin Biel*

*Faculty Mentor(s): Venumadhav Korampally*

*Session Time: 11 to noon                      Poster #164*

The ability to detect changes in pH using basic electrical components will profoundly affect healthcare accessibility. When a disease is tested for a virus, it is common that the pH level will increase. This reaction can be done at a smaller level. The goal is to make disposable and cost-efficient devices to allow for a wide range of people to benefit from medical testing. Performing the testing and pH analysis in a non-lab setting poses unique challenges but can be solved using basic electrical components that are found in almost every electrical device. There are unique electrical components that will help with this. If results can be achieved, more accessible medical testing can be available to more people. Working on this project has helped me grow my learning in ways that can hopefully help benefit communities around the globe.

### **Reconfigurable Microfluidic Diode Valves for Improving Lateral Flow Assays**

*Presenter(s): Natalia Cruz*

*Faculty Mentor(s): Venumadhav Korampally*

*Session Time: 9 to 10a.m.                      Poster #172*

*Research Rookie*

Lateral Flow assays are widely used for point-of-care diagnostics due to their simplicity, rapidity, and low cost. The development of reconfigurable microfluidic diode valves represents a significant leap in lateral flow assays for point-of-care testing. These valves offer precise control over fluid movement, enhancing the reliability and accuracy of diagnostic tests. By addressing the limitations of current methods such as ELISA, particularly in terms of cost and accessibility, this research aims to democratize healthcare by providing affordable and user-friendly testing devices. Through proof-of-concept testing and optimization of diode configurations, the experiment focuses on observing and understanding flow dynamics within single-diode-designed strips, aiming to optimize fluid control and automation. It demonstrates the potential of these innovative devices to revolutionize point-of-care diagnostics, ultimately advancing healthcare accessibility and effectiveness.

### **Efficacy and Efficiency of Additive-Manufactured (AM) Airfoils**

*Presenter(s): Cristian Dondiego and Alexandria Velazquez*

*Faculty Mentor(s): Nicholas Pohlman*

*Session Time: 10 to 11a.m.                      Poster #183*

*Student Engagement Fund*

Determining the applications of additive manufacturing (AM) beyond prototyping has become a pressing question since AM via 3D Printers are becoming increasingly prevalent both commercially and recreationally. The application of interest is whether constructing an aircraft for the 2025 SAE Aero Design competition is a viable application. The issues addressed are :(1) determining the practicality of printing airfoils



for amateur aircraft and (2) if viable, their efficiency when considered against other foils of differing variables: materials, internal supports and geometries. The project consists of modeling and simulation software to construct and compare foils, 3D printers and potentially a wind tunnel for experimental results. Qualitative observations show the profound strength-to-weight ratio of the construction to its low density and impressive quality from a proof-of-concept. Future research is focused upon determining the effects of surface treatment for increased smoothness and exotic internal supports for decreased weight on performance.

### **Arduino-based Autonomous Mobile Robot with Integrated Vision Feedback System**

*Presenter(s): Nickolas Giffen*

*Faculty Mentor(s): Ji-Chul Ryu and Nicholas Pohlman*

*Session Time: 10 to 11a.m.      Poster #185*

*Senior Design Project*

This project displays the capabilities of mobile robotics and the impact of control on autonomous behavior. As robots continue to be incorporated into industrial applications and society at large, experimentation into the capabilities of autonomous behavior gives insight into applications of this technology. The autonomous, mobile robot built performs multiple autonomous tasks involving distance sensing, signal following, and position tracking. The PID control algorithm can be tuned to achieve the desired performance of autonomous behavior.

### **Modular Workholder for Inspection: Optimizing inspection of runout for cylindrical parts**

*Presenter(s): Faraz Khalid, Andrew Guidry, and Abdullah Thahab*

*Faculty Mentor(s): Brian Coller*

*Session Time: 11 to noon      Poster #184*

*Senior Design Project*

This project involved design of a modular work holder to inspect the runout of cylindrical parts. Runout, or ensuring a part is as close to a perfect circle as possible, is a time-consuming process that must be completed weekly at minimum. The primary objective is to reduce the amount of time taken to complete each inspection. The project involved design, 3D modeling, creating drawings for each component, communicating with the project sponsor, part sourcing, production and assembly. The product successfully reduced the time it takes to check runout of cylindrical parts.

### **Designing a Cerebellar Model Articulation Controller for Applications in Automatic Control**

*Presenter(s): J. C. La Barbera*

*Faculty Mentor(s): Peter Lin*

*Session Time: 9 to 10a.m.      Poster #176*

*Senior Design Project*

A Cerebellar Model Articulation Controller (CMAC) is a neural network designed to mimic the human cerebellum, allowing it to learn certain problems faster than conventional models. A CMAC like this has a variety of applications, from medical diagnostics to image classification, but in this case the attention is on mobile robot control that could allow a robot to adapt to new movement or location with little or no human intervention. The project involves constructing a CMAC that is easy to use and is computationally inexpensive, while taking advantage of its speed. The robustness of the model was tested using a variety of mathematical and physical formulae. Preliminary results show that the CMAC is effective at isolating individual patterns. Future work involves expansion to extract related patterns at once.

### **Simulation of a PID Mass Flow Controller for Aerosol Mitigation**

*Presenter(s): Neil Bernardino, Baltazar Del Rosario V and Debojit Roy*

*Faculty Mentor(s): Eric Lee*

*Session Time: 11 to noon*

*Poster #168*

*Senior Design Project*

To make sure that manufacturers deliver reliable filters, they need to be tested by an aerosol sampling train primarily driven by mass flow. The main flow source is an induction fan installed downstream that pulls aerosol particles through the test filter where balance measurements can be made to determine the amount of target particles that were trapped or let through. If the aerosol particles penetrate the filter, a HEPA filter captures the target particles in the sample train and prevents them from being released into the lab environment. Eventually, the HEPA filter will become saturated, and the flow will be reduced. To maintain a constant flow rate for predicting the performance of a test filter, a PID mass flow controller is needed.

### **Pneumatic Cylinder Heat Press for Blister Packaging: Troubleshooting & Analysis**

*Presenter(s): Cristian Gonzalez, Jack Cleave, Peter Matranga*

*Faculty Mentor(s): Tariq Shamim*

*Session Time: 10 to 11a.m.*

*Poster #171*

*Senior Design Project*

Efficient and precise pneumatic (air) cylinder operation is crucial for various industrial processes, including heavy-duty pressing and intricate packaging operations. Misalignments can jeopardize system reliability, leading to uneven pressure distribution, accelerated wear, and significant maintenance costs. This study aims to address misalignment issues in pneumatic systems used in blister packaging manufacturing, particularly in high-temperature environments. The approach involves utilizing Finite Element Analysis (FEA) to identify misalignment causes and integrating a design solution into existing machinery, considering constraints of manufacturability and serviceability. Key findings reveal thermal expansion of the machinery as a primary factor causing cylinder side loading and component degradation. Subsequent steps involve implementing a rack and pinion device to mitigate cylinder misalignment and improve system performance and longevity.

### **Implementation of a Building Automation System**

*Presenter(s): Joe Lofthouse and Zach Yadanza*

*Faculty Mentor(s): Nicholas Pohlman*

*Session Time: 9 to 10a.m. Poster #178*

*Senior Design Project*

This project presents a thorough analysis aimed at enhancing the control systems within DuSable Hall on NIU's campus. The primary goal is to optimize the building's HVAC infrastructure by integrating advanced Building Automation Systems (BAS). The research focuses on dissecting the Air Handling Unit within DuSable Hall, examining critical components such as Variable Frequency Drives, Variable Air Volume units, dampers, supply/return fans, and heating/cooling coils. Collaborating with TRANE Technologies and leveraging their project management design tools, a comprehensive plan for a BAS upgrade has been devised. Initial findings suggest potential for energy conservation, enhanced occupant comfort, and increased system reliability through the implementation of a BAS upgrade. These enhancements are in line with NIU's sustainability objectives, which strive to achieve carbon neutrality by 2050.

### **Bridge Enhanced ACL Repair Graft as an Alternative to ACL Reconstruction**

*Presenter(s): Sidney McCrea*

*Faculty Mentor(s): Alisha Diggs*

*Session Time: 2 to 3p.m. Poster #175*

*Senior Design Project*

Each year, thousands of athletes suffer anterior cruciate ligament (ACL) tears in their knee, impacting stability and agility. Current surgical reconstruction often involves using tendons from other body parts, posing challenges. The innovative Bridge-Enhanced ACL Repair (BEAR) graft merges engineering with medicine to leverage the body's natural healing mechanisms. This systematic literature review assesses differences between BEAR grafts and traditional ACL reconstruction with respect to patient outcomes, reinjury rates, and return-to-sport timelines. Two clinical trials are evaluated focused on patients aged 14-55 injured during organized sports. Results reveal comparable patient-reported outcomes and return-to-sport timelines between BEAR grafts and traditional reconstruction, with superior hamstring strength observed in BEAR graft patients. This novel approach circumvents traditional reconstruction challenges while offering similar outcomes and enhanced hamstring strength, suggesting a promising future for ACL repair with potentially superior long-term results.

### **Enhancing and Evaluating the Performance of a Motorized Wheeled Sled-Push**

*Presenter(s): George Meeks*

*Faculty Mentor(s): Ji-Chul Ryu*

*Session Time: 2 to 3p.m. Poster #181*

*Research Rookies*

This research project proposes the enhancement and evaluation on the performance of a motorized wheeled sled-push. This is an apparatus specifically tailored for the elderly



population to address the challenges associated with physical inactivity by encouraging active exercise participation and thus mitigating physiological decline. The motorized wheeled sled-push consists of three primary sensors and an LCD display. The three primary sensors include the heart rate sensor for monitoring cardiac activity, a force sensor to measure exerted force of the users that is used to push the sled and hall effect sensor for speed determination. All controlled by an Arduino UNO and displayed on an LCD screen. Through systematic enhancement and evaluation of these sensors, this project seeks to offer an effective solution to help combat age-related health issues and improve overall well-being in the elderly population.

### **The Mixing of Existing Fibrin Models to Produce a Cohesive, Accurate, and Reproducible Model of the Fibrin Network within Blood Clots (CANCELLED)**

*Presenter(s): Ryan Mueller*

*Faculty Mentor(s): Jifu Tan*

*Session Time: 9 to 10a.m.*

*Poster #180*

Many models of fibrin fibers exist but very few of them have been made compatible with each other. This project was completed to provide future researchers with a holistic representation of fibrin mechanics with consistent parameters, units, and experimental data. The advantages of fibrin modeling methods were analyzed, and a combination of the models occurred to produce compound fibrin models. These compound fibrin models give researchers the ability to mix modeling methods within fibrin networks to produce more realistic models of blood clots. These compound models will be used in large-scale multiphysics simulations to model anisotropic blood clots featuring red blood cells, platelets, and plasma held together by a fibrin network. These simulations will provide a better understanding of clot mechanics and how a blood clot forms, decays, and breaks away from vein walls.

### **3D Printing for a Sustainable World**

*Presenter(s): Ryan Mueller, Nathan Brown, and Jackson Heinzer*

*Faculty Mentor(s): Sahar Vahabzadeh and Madhi Vaezi*

*Session Time: 2 to 3p.m.*

*Poster #167*

The popularity and availability of 3D printers over the last decade has resulted in an increased use of plastic for prototypes and knickknacks. Researchers at NIU are investigating the merits of mixing hemp fibers with common 3D printing plastics to reduce the amount of plastic used for each project. To support these research efforts, a 3D printer capable of using variable diameters and concentrations of hemp-infused plastic filaments was created. This custom printer paves the way for the commercialization of adaptable, dependable, and sustainable 3D printing at an industrial and consumer level.

### **Low-Cost Animal Incubator**

*Presenter(s): Will Parker*

*Faculty Mentor(s): Y.J. Lin*

*Session Time: 2 to 3p.m.*

*Poster #173*

*Senior Design Project*

This research project explores the design of a low-cost animal incubator that can be mass produced and sold to low-profit and non-profit organizations for animal and wildlife rehabilitation. The incubator system consists of three subsystems including a feedback control system for regulating temperature, an interfacing system that allows user input, and a stackable housing structure that can be readily manufactured. The temperature control system uses a proportional-integral-derivative (PID) compensation algorithm executed via a microcontroller powered by a standard 120 VAC outlet. The code for the PID algorithm receives the inputs and calculates the outputs by accepting user-desired reference values via the interfacing menu and the actual temperature readings. There are audio-and-visual alarm systems in place for warning users when the temperature or humidity falls outside the accepted error bounds of within 3 degrees Fahrenheit for the reference temperature or within 10% of the desired humidity.

### **SSR1 Cryomodule Assembly Alignment**

*Presenter(s): Zach Russell, Jason Martin and Kenny Beauchane*

*Faculty Mentor(s): Iman Salehinia*

*Session Time: 10 to 11a.m.*

*Poster #174*

*Senior Design Project*

Fermilab National Laboratory utilizes high-speed particles to deepen the world's understanding of human existence. Fermilab employs accelerators to ensure that the particles reach the appropriate speeds. At the beginning of the acceleration process, there is a section of accelerators called *cryomodules*. The cryomodules operate under a temperature of 2 Kelvin. The main components inside each cryomodule include cavities, target frame assemblies, and solenoids. The task of this project is to investigate the thermal-structural effects on the cryomodule components using a finite elemental analysis (FEA) software called Ansys Mechanical. The analysis will simulate the displacement of the target frame assemblies when the cryomodules are cooled down to operating temperature. When the target frame assembly displacements are found, the engineers at Fermilab can determine where the other components should be positioned, prior to operation. By properly positioning the cryomodule components, Fermilab can maintain the most efficient and effective particle acceleration process.

### **iGAIT: An Engineering Solution to Early Screening of Autism Spectrum Disorder for Children**

*Presenter(s): Michael Sensenbrenner and John White*

*Faculty Mentor(s): Ziteng Wang, Allison Gladfelter, and Milijana Buac*

*Session Time: 2 to 3p.m.*

*Poster #170*

*Student Engagement Fund*

The objective of this research project is to develop a mobile-friendly website that leverages machine learning and high-performance computing to predict autism spectrum disorder (ASD) in children based on their walking gait in a cost-free manner for users across the world, especially families in underserved, underrepresented, and low-income communities. By developing a website accessible to the public, this study aims to assist users with information and resources for understanding their children's ASD by offering services such as free evaluation of their child, free information on ASD, and suggestions regarding whether their child should seek a professional diagnosis from experts. The project seeks a secure and high-performance solution by integrating Amazon Web Services, Google Firebase, NIU Metis cluster, and NIU OneDrive services. Further tests are expected to validate the application and improve the machine learning model.

#### **Four-Legged Robot Design**

*Presenter(s): Zach Schmidt*

*Faculty Mentor(s): Kyu Taek Cho*

*Session Time: 9 to 10a.m. Poster #169*

*Research Rookies*

There are many quadruped robots, but finding an inexpensive, capable, scalable and adaptive robot is very difficult. A cheap, quadruped robot can be used to provide a foundation for the integration of new technologies and control systems.

#### **Analysis of the Microstructure of Additively Manufactured Samples Using Machine Learning Algorithms**

*Presenter(s): Courtney Shimp*

*Faculty Mentor(s): Kyu Taek Cho*

*Session Time: 1 to 2p.m. Poster #165*

*Student Engagement Fund*

The research explores the application of machine learning through convolutional neural networks (CNNs) by analyzing the microstructure of additively manufactured samples, focusing on porosity levels in five different cobalt chrome samples. Utilizing Python, machine learning, and transfer learning techniques, a program was developed to identify porosity levels based on microstructure images. The study included 4500 images of different cobalt chrome samples with varying porosity levels. This involved understanding CNNs and adapting them to fit the porosity dataset. Preliminary results show promising potential for accurately categorizing the porosity levels in the five datasets. Future implications include being able to optimize additively manufactured samples to the desired porosity levels and extending the approach to analyze other microstructural features or images.



### **Fermilab Test Beam Gas Mixer**

*Presenter(s): Soka Suliman, Colin Oleniczak, and Nicholas Ruiz*

*Faculty Mentor(s): Nicholas Pohlman*

*Session Time: 2 to 3p.m. Poster #179*

*Senior Design Project*

This project introduces the development of a modular gas mixing system at Fermilab's Test Beam Facility for high-energy physics experiments. Current methods for gas mixing include using either pre-mixed bottles or custom-built mixers which are inefficient and costly. To address this, a modular gas mixing system capable of combining up to four gases into a single output has been designed. This system aims to accommodate diverse scientific needs, facilitate future advancements in gas technology, and enable quick adjustability of output parameters such as pressure and flow rate. By providing a flexible and efficient solution, the modular gas mixing system seeks to streamline experimental processes and minimize costs associated with safety reviews for custom equipment. Ultimately, this system enhances the capabilities of experiments conducted at Fermilab by providing researchers with a reliable and adaptable tool for studying atomic particles traveling close to the speed of light.

### **Frequency Domain Study of Battery Health Characteristics**

*Presenter(s): Aditi Venkatesh*

*Faculty Mentor(s): Donald Zinger*

*Session Time: 2 to 3p.m. Poster #177*

*Research Rookie*

With innovations in electronics, automobiles, and energy storage, there is an increased demand for Lithium-Ion batteries. Therefore, the need to optimize battery performance becomes more prevalent daily. One technique to assess battery performance is Electrochemical Impedance Spectroscopy (EIS). By measuring the impedance of a battery at varying frequencies, EIS provides information about the internal processes and properties that affect its operation. To investigate the EIS of the battery, a battery was placed in series with two resistors and a capacitor. The capacitor acts as a filter for any noise, the resistors act as a current limiting resistor and a voltage drop resistor. A signal analyzer was used to construct bode plots, which depict the phase and magnitude at varying frequencies of the AC source. Although there was a significant amount of noise above 100Hz, limiting the data we could use, these findings can be used for further research and experimentation.

### **Sustainable Operations: Building Energy Analysis**

*Presenter(s): Jason Zhao, Alek Lancaster, and Ben Koranda*

*Faculty Mentor(s): Sachit Butail*

*Session Time: 11 to noon Poster #166*

*Senior Design Project*

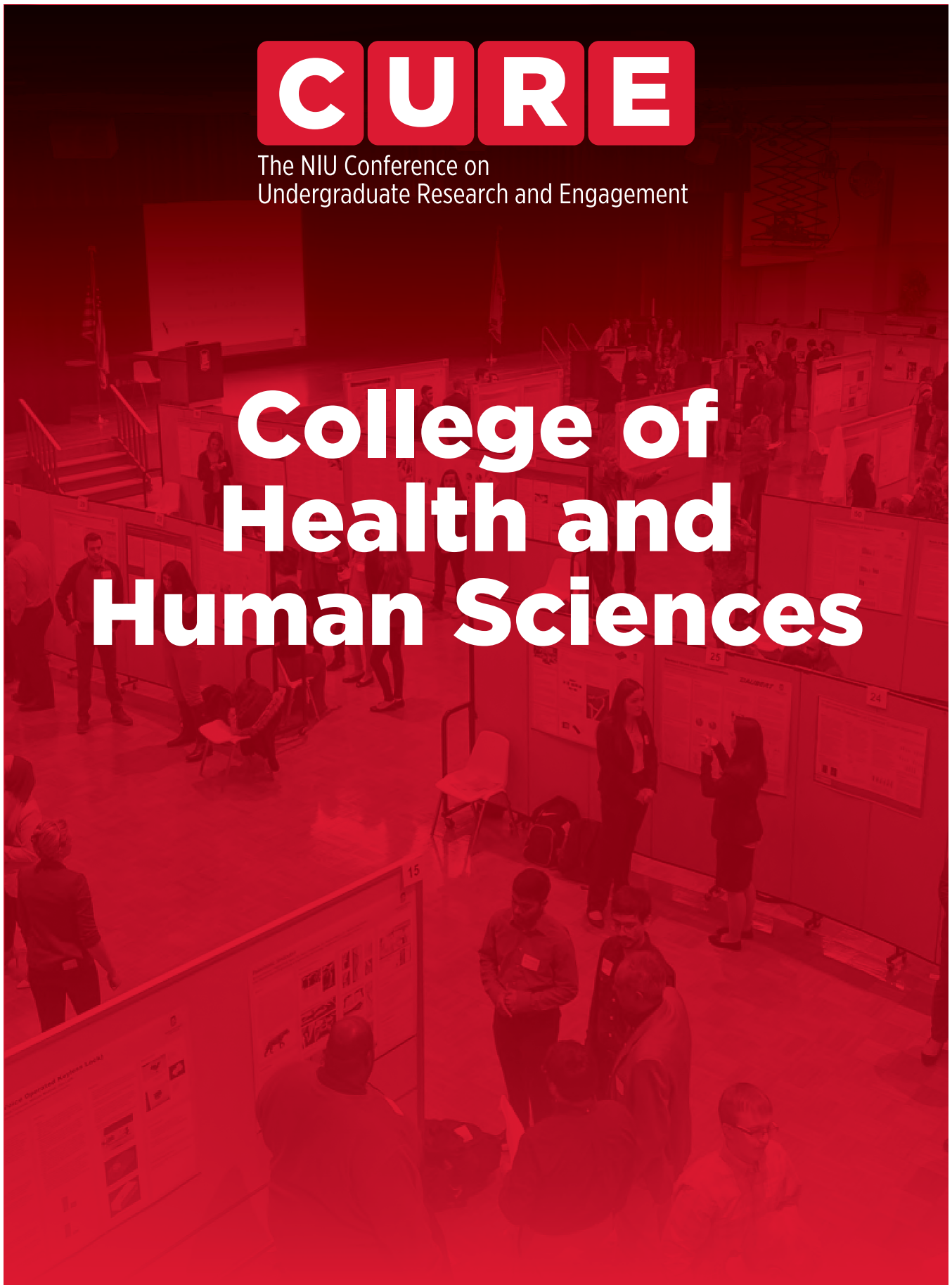
Northern Illinois University Sustainability and Climate Action Plan is NIU's road map towards a more sustainable future. The objective of this project is to perform an energy

audit for a selected building (DuSable Hall) and recommend ways to reduce energy use, carbon emissions, and cost. Then, a standard operating procedure (SOP) will be written on how to do an energy audit for other buildings on campus. This project will serve as a pilot study to the rest of the buildings on campus to benchmark and assess using the SOP developed.



The NIU Conference on  
Undergraduate Research and Engagement

# College of Health and Human Sciences



## **Compassion Fatigue Among Nurses and Caregivers**

*Presenter(s): Alexis Allen*

*Faculty Mentor(s): Tomoyuki Shibata*

*Session Time: 2 to 3p.m. Poster #121*

*Research Rookies*

Nurses and caregivers face mental health challenges while working in the healthcare setting. Compassion fatigue, a secondary traumatic stress disorder, is the traumatization of emotional and psychological results of helping traumatic persons. Researching secondary traumatic stress disorder is essential as it correlates to burnout and an individual's wellbeing. The objective of this study is to examine compassion fatigue and burnout to understand factors associated with mental health among nurses and caregivers in the workplace. Online surveys detailing compassion fatigue, moral injury, burnout and hope were distributed to nursing and caregiving professionals. With expected results linking compassion fatigue and burnout, the results will be essential in supporting evidenced-based interventions to promote a healthy work environment for healthcare professionals.

## **Exploring the Impact of Parental Mobile Device Usage on the Early Language Environment**

*Presenter(s): Diana Alvarez*

*Faculty Mentor(s): Melissa Clucas Walter*

*Session Time: 10 to 11a.m. Poster #127*

*Student Engagement Fund*

This study aims to assess mobile device usage among parents of young children and its impact on the child's home language environment, which is essential for brain development. The project investigates how parental screen time affects the quality and frequency of conversational turns—specifically, non-cry sounds made by the child following spoken language. These turns, recorded by vests worn by children, provided data for analysis. Parents logged their mobile device usage in weekly diaries over a month, including time spent on devices, supplemented by usage screenshots. Analyzing the relationship between conversational turns and mobile device usage, we hypothesize that increased screen time correlates with reduced conversational quality and quantity. This research could offer insights into optimizing language-rich environments for children's developmental benefits.

## **Implementing Neuroprotective Education and Training for Older Adults**

*Presenter(s): RYANNE ANDERSON AND JAMIE WARD*

*Faculty Mentor(s): Jamie Mayer*

*Session Time: 11 to noon Poster #112*

*Student Engagement Fund*

"Brain Games" is a neuroprotective education and cognitive training course developed at NIU for older adults and designed to help promote healthy cognition amidst the rapidly growing population with mild cognitive impairment and dementia. Brain Games



training (e.g., memory, word finding, and attention exercises alongside education about cognitive functions in the adult brain) was provided over 20 one-hour sessions during two academic semesters at a local retirement facility. Recruitment data, subjective participant feedback, and retention rates were examined to determine feasibility and implementation. Preliminary results showed acceptable rates of participation and retention. Participants preferred hands-on, challenging activities centering around memory skills and strategies. Participants also reported that a key aspect of their retention was social interaction amongst peers and the NIU student volunteers. This data will be used to further refine the "Brain games" protocol to maximize cognitive reserve and enhance social well-being in the aging population.

### **Addressing Stroke Care Disparities through Patient Education**

*Presenter(s): Christina Annerino*

*Faculty Mentor(s): Jennifer Sharp*

*Session Time: 10 to 11a.m. Poster #110*

*Honors Capstone*

Current stroke care and patient outcome data demonstrates a disparity in disability and mortality between male and female patients who have experienced stroke that has not yet been fully addressed by peer reviewed literature. This study began by conducting a survey of 130 participants, men and women aged 18-80, to evaluate potential barriers to accessing stroke care and effective treatment. Preliminary survey data demonstrated consistent gaps in knowledge related to stroke risks, stroke symptoms, and when to seek care for a suspected stroke, with more profound deficits in knowledge of risks and symptoms that are common in women. Patient education materials were then developed based upon survey results, with content targeted at improving understanding of when to seek emergency care and of stroke risks and symptoms more common in female patients. Efficacy was assessed through comparison of knowledge and confidence surveys conducted before and after review of the educational materials.

### **Romantic Relationship Formation Continuum: An Exploration of Steps and Stages Leading to a Committed Relationship**

*Presenter(s): Bella Boccia*

*Faculty Mentor(s): D. Scott Sibley*

*Session Time: 2 to 3p.m. Poster #117*

This qualitative student study included 33 emerging adults (28 women, 5 men) and explored the steps, stages, and readiness of entering a committed relationship with the potential end-goal of marriage. Eight unique themes emerged through qualitative analysis about committed relationships: sense of security and support, provides purpose and meaning (marriage), an investment in the future (marriage, the long haul, children, etc.), building a foundation (friendship), clarification of commitment (cutting off other options), apprehension about committed relationships (fear of rejection, unclear intentions, focusing on self, etc.), personal growth, and marriage not being the end goal for all.

## **Assessing Levels of Moral Injury Among Nurses and Caregivers**

*Presenter(s): Cindy Carbajal*

*Faculty Mentor(s): Tomoyuki Shibata*

*Session Time: 2 to 3p.m. Poster #115*

*Research Rookie*

The mental health impact of experiencing morally injurious events that go against one's moral beliefs and values is referred to as moral injury. Among nurses and caretakers, moral injury may lead to other mental health issues, such as burnout and depression. Furthermore, the degree of moral injury experienced among those professionals could be associated with an increased risk of medical errors. To further understand this, a comprehensive online survey was used to gather relevant data including demographics, occupation and its responsibilities, and other mental health variables, such as compassion fatigue, burnout, and hope. This ongoing study is expected to provide meaningful results that may contribute to a greater understanding of how the mental health of these professionals is impacted by morally injurious events. The next practicable steps can then be pursued to help healthcare professionals take better care of themselves and their patients.

## **A Descriptive Cross-Sectional Survey on Risk for Prediabetes Among NIU Staff and Students**

*Presenter(s): Scott Conro*

*Faculty Mentor(s): Sheila Barrett*

*Session Time: 2 to 3p.m. Poster #123*

*Student Engagement Fund*

This study's purpose is to discover the prevalence of prediabetes among staff and students at NIU. According to the 2022 National Diabetes Statistics Report, 37.3 million people in the United States have diabetes. Of this number, 28.7 million have been diagnosed and 8.5 million are undiagnosed. In addition, 96 million people over 18 have prediabetes. Risk factors include HbA1c, blood pressure, waist/hip circumference, body composition data, and presence of Acanthosis Nigricans. Approximately 40 NIU staff and students were contacted by email survey to collect data for a descriptive epidemiological cross-sectional study. Data collection is ongoing, but early results show that part of the student population is at risk for prediabetes. Results will influence decisions to implement interventions.

## **Exploring the Theory of Resilient Commitment in Emerging Adulthood**

*Presenter(s): Alexis Elliot*

*Faculty Mentor(s): D. Scott Sibley*

*Session Time: 9 to 10a.m. Poster #109*

The purpose of this qualitative study was to explore the theory of resilient commitment (Sibley, Vennum, & Hartenstein, 2023) with an emerging adult (18-29 year of age) population. We explored how emerging adults define commitment in romantic relationships and create meaning from the positive and negative examples of commitment they have witnessed. Participants included twenty (10 men, 10 women)

unmarried emerging adults at a large Midwestern university participated and data was collected through interviews. 55% of the participants were in a romantic relationship at the time (10 with opposite-sex partners, 1 with a same sex partner). 85% of the participants indicated that they had previously been in a romantic relationship. Through grounded theory, seven themes and five sub-themes were constructed. These results extend our knowledge about the model of resilient commitment and the critical purpose of meaning making.

### **Cognitive Stimulation for Dementia: What matters?**

*Presenter(s): Hannah Gebke*

*Faculty Mentor(s): Jamie Mayer*

*Session Time: 1 to 2p.m.*

*Poster #124*

*Research Rookies*

Cognitive stimulation is an intervention designed for people with dementia; the goal is to stimulate thinking and memory within a social context. Researchers have focused on the impacts of art, singing, Montessori, and music activities individually. However, the “active ingredients” of these interventions, including whether participants with dementia are simply benefiting from social stimulation regardless of the content and mode of delivery, are not known. Therefore, we examined the effects of two types of cognitive stimulation – reading and art – on participants’ engagement and communication compared to a baseline activity (conversation). Preliminary results showed an increase in engagement across all activities, including baseline. However, we also found that the reading intervention increased participants’ communication compared to baseline. Thus, cognitive stimulation benefits go beyond simply social interaction. Results of this study will help inform best practices for maximizing engagement, communication, and quality of life for people with dementia.

### **Nourish NIU: Cultivating Wellness within NIU Students**

*Presenter(s): Kennedy Hansen and Josephine Fernandez Ong*

*Faculty Mentor(s): Melani Duffrin*

*Session Time: 11 to noon*

*Poster #128*

Edible Campus, a Northern Illinois University Garden, aimed to address the growing food insecurity issue among college students by increasing their awareness and access to fresh produce. The primary objective of Edible Campus was to build a living laboratory for students to learn more about focused food systems. Our initiative involved hosting an information table at the Holmes Student Center which included a tri-fold poster presentation on Edible Campus. After the presentation, students completed a post-survey. These activities gauged the students’ prior knowledge of food insecurities and nutrition and educated students about the availability and benefits of fresh produce grown on campus. By educating students on Edible Campus, we hoped to increase the utilization of the garden and encourage our students to consume more locally fresh produce.

### **Microplastic Ingestion: Exposure, Risk, and Management**

*Presenter(s): Jennifer Hernandez, Ashley Kelly, Abbigayle Bushmole*

*Faculty Mentor(s): Tomoyuki Shibata, Melissa Lenczewski, and Pallavi Singh*

*Session Time: 11 to noon*

*Poster #122*

Due to widespread pollution, microplastics (MP) are becoming a large cause for concern regarding public health. Once ingested, MPs bioaccumulate in organs and may result in health complications, such as inflammation. Our goal is to investigate the potential adverse health effects of MP ingestion through multiple water sources such as tap water, bottled water, and fish. A simulated exposure assessment was conducted to estimate the dose of MPs needed for risk characterization. The concentration levels of MPs collected indicated exposure pathways and average human ingestion, both of which provide valuable insight into the reality concerning the potential hazards of MPs. However, concluding the risk assessment has been made difficult due to a lack of dose-response data. The significance of this study underscores the importance of further research into microplastic dose-response, prevention, and increased development of MP detection and remediation technologies.

### **Training the Future Dementia Care Workforce: Improving Attitudes through Experiential Learning**

*Presenter(s): Abigail Juenger*

*Faculty Mentor(s): Jamie*

*Session Time: 1 to 2p.m.*

*Poster #119*

*Honors Capstone*

The number of Americans with dementia has increased dramatically as the population ages and is projected to continue doing so. Thus, there is a critical need for a skilled dementia workforce; however, workforce development has not kept pace with the growing demand for dementia care. Providing education and experiential learning opportunities to students can garner interest in aging-related careers and thus begin to address this gap. Toward this end, we report effects of a dementia service-learning program in which students regularly interacted with individuals with AD/DR at local memory care centers in the context of arts-based interventions (e.g., painting). Preliminary results showed an increase in dementia knowledge, and social comfort towards people with AD/DR for student volunteers compared to students who did not participate in the program. Results of this study will help inform best practices for recruiting and training the future dementia care workforce.

### **Proceed with Caution: How Emerging Adults are Testing the Water in Just Talking Romantic Relationships**

*Presenter(s): Pelin Keceli and Jordyn Saddler*

*Faculty Mentor(s): D. Scott Sibley*

*Session Time: 2 to 3p.m.*

*Poster#:129*

This study explored the emergent phenomenon in modern romantic relationship formation called *just talking*. Quantitative data was collected from 655 emerging adult



(18-29 years of age) participants. On average, the participants strongly agreed that just talking has become a normative part of romantic relationship formation; just talking can lead to a committed relationship; and that technology is important to just talking. Men and women differed on their endorsement of just talking as a distinct from dating, the level of commitment involved in just talking, and preference for just talking versus dating someone.

### **Study on Treatment of Children with Autism in Public Elementary Schools in Illinois**

*Presenter(s): Zachary King*

*Faculty Mentor(s): Byran Dallas*

*Session Time: 11 to noon*

*Poster #105*

*Honors Capstone*

This project focuses on whether the care and treatment of children with autism in public elementary schools has improved in Illinois over the past 20 years. This research consists of a satisfaction survey for parents, providing data on the present-day treatment and care of children with autism in elementary schools in Illinois. The past 20 years will be presented through a literature review about treatment across the Midwest in the U.S. The results expected are that the treatment and care of children with autism has improved in Illinois in the past 20 years. The significance of these results is that progress is being made in understanding autism and that educators have become more attuned to the needs of children with autism in the classroom.

### **Eat to Compete**

*Presenter(s): Chelby Koker, Melissa Perry, and Derrik Clanton*

*Faculty Mentor(s): Melani Duffrin and Julie Patterson*

*Session Time: 2 to 3p.m.*

*Poster #104*

*Honors Capstone*

Female Student athletes are at an elevated risk of developing Female Athlete Triad. The triad, low energy availability (LEA), amenorrhea, and low bone density, are affecting many athletes' performance, recovery, and injury rates. LEA is observed in as many of 63% of NCAA competing females. The purpose of this project was to create, implement, and evaluate a program called *Eat to Compete* to improve NIU's women's basketball team (WBT) awareness and confidence to mitigate LEA. In Fall 2023, NIU WBT was surveyed to determine nutrition topics of interest. The needs assessment indicated that athletes were most interested in learning about caloric needs. Moreover, 100% of respondents indicated they wanted to learn more about how nutrition affects recovery and sport performance. This data was used to inform the creation of *Eat to Compete*. The next steps of research are aimed at improving the nutrition education session by using the feedback given and offering the education session to more athletes at NIU and eventually at other schools.

### **Hippotherapy within Physical Therapy Treatment: Helping Patients with Cerebral Palsy Achieve Functional Goals**

*Presenter(s): Grace Kucienski*

*Faculty Mentor(s): Ellen Bonine*

*Session Time: 9 to 10a.m.*

*Poster #116*

*Honors Capstone*

Hippotherapy is a treatment tool used by trained occupational therapists, speech language pathologists, and physical therapists. It involves the utilization of a horse's movement to facilitate certain sensory, adaptive, neuromotor, cognitive, and physical responses from a patient. This project examines how hippotherapy as a treatment tool in physical therapy benefits children with cerebral palsy. This project was conducted in a case study format. For twelve weeks, one patient with cerebral palsy was observed during physical therapy sessions utilizing hippotherapy. During these sessions, her progress towards reaching a specific functional goal, crossing midline dynamically, was tracked. A video presentation of these findings allows viewers of this project to be able to visualize the results for themselves as hippotherapy is a non-traditional treatment tool, and individuals may not be familiar with the ways in which hippotherapy is integrated into a physical therapist's treatment plan.

### **Investigating Risk and Awareness of Celiac Disease Among Northern Illinois University Students**

*Presenter(s): Jersey Lefaver and Chloe Starr*

*Faculty Mentor(s): Sheila Barrett*

*Session Time: 1 to 2p.m.*

*Poster #126*

*Student Engagement Fund*

The purpose of this project is to evaluate the risk factors for celiac disease among current NIU students; assess the effectiveness and satisfaction with the services that NIU provides to manage celiac disease; and determine the existing knowledge about celiac disease among these students. Celiac disease is an overlooked and commonly undiagnosed condition that poses negative side effects to an individual if a diagnosis is missed. A cross-sectional online survey was sent out through email to NIU to understand student awareness and usage and effectiveness of NIU resources available to aid in the management of celiac disease. Results will help guide delivery and possible enhancements of these resources.

### **Antibiotics and Antimicrobial Resistant Bacteria: Investigating Public Health Impacts and Resistant Bacteria Originated from Wastewater Treatment Plant**

*Presenter(s): Cassandra Lopez Almanza*

*Faculty Mentor(s): Tomokuyi Shibata*

*Session Time: 10-11a.m.*

*Poster #118*

Antibiotics and antimicrobial-resistant bacteria (ARB) are a global threat to human health, challenging public health, medical treatments, and medical practices. Antimicrobial resistance (AMR) is posing a significant threat to antibiotic efficacy,

making once-treatable infections increasingly difficult to manage, leading to prolonged illness, increased mortality rates, and higher healthcare costs. Based on this literature review, antibacterial and antimicrobial resistance bacteria, such as *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterobacter species*, and *Legionella pneumophila*, have been found in wastewater treatment plants. However, there is limited evidence regarding the infectious risk posed by those pathogens from wastewater. A quantitative microbial risk assessment (QMRA) was performed comprised hazard identification, dose response, exposure assessment, risk characterization, and risk management to address the potential impact on human health associated with ARB originated from wastewater treatment plants. Additionally, mitigation strategies will be discussed as part of risk management.

### **Growing Together Live. Learn. Thrive: Indoor Gardening**

*Presenter(s): Carolyn Mette, Gabrielle Bostwick, Nesreen Warak*

*Faculty Mentor(s): Melani Duffrin*

*Session Time: 9 to 10a.m. Poster#102*

Food insecurity is a prevalent issue in Northern Illinois. *Growing Together* is part of an initiative under Northern Illinois Food Bank's mind, body, and spirit initiative to help hungry neighbors with food insecurity through gardening. The *Growing Together* indoor gardening project, spearheaded by students from Northern Illinois University (NIU), seeks to address food insecurity and promote sustainability within the Barb Food Mart Community and the Store at Harvest Chapel by establishing indoor gardens. Recognizing the importance of local fresh produce in supporting community health, resilience, and food insecurity, this initiative aims to empower residents by providing nutritious food year-round, regardless of outdoor growing conditions. Information derived from this study will help Northern Illinois Food Bank grow their Mind, Body, Spirit initiative to better serve the neighbors in their communities.

### **Cultivating Care: Supporting our Students with Eating Concerns**

*Presenter(s): Tatiana Miralaeff, Grace Molina, and Kaz Lockwood*

*Faculty Mentor(s): Melani Duffrin and Julie Patterson*

*Session Time: 9 to 10a.m. Poster #120*

Cultivating Care is a workshop designed to improve faculty and staff skills in detecting and referring students with eating concerns. The workshop curriculum is grounded in constructivist learning theory and aims to build on learners' preexisting skills through collaborative discussion. This exploratory case study implemented an eating concerns professional development (PD) workshop with university faculty and staff (N=15). Activities integrated into the workshop allowed researchers the opportunity to gauge participants' knowledge throughout the experience. Formative evaluation indicated that participants achieved considerable gains in knowledge. The most common gain was knowing where to refer students on- and off-campus. Post-PD summative evaluation concluded 100% of the respondents were comfortable discussing with students, reported knowledge of knowing referral resources, and would recommend the PD to other faculty and staff. Information derived from this study will be utilized to implement a

better-informed eating concerns PD experience for larger numbers of university faculty and staff.

### **A Multi-State Look into Early Intervention Speech-Language Pathologists' Confidence Identifying and Diagnosing Autism**

*Presenter(s): Adelaide Parr*

*Faculty Mentor(s): Allison Gladfelter*

*Session Time: 10 to 11a.m. Poster #108*

*Honors Capstone*

Although autism can be reliably diagnosed by 18 months of age, long wait times and limited access to qualified providers prevent families from obtaining services. Trained speech-language pathologists (SLPs) are qualified to diagnose autism, ideally as part of a multidisciplinary team. SLPs working on early intervention (EI) teams are well-situated to help close this diagnostic wait time gap. The purpose of this survey study was to explore EI SLPs' confidence in identifying and diagnosing autism, experiences serving autistic children, and potential barriers/facilitators to increasing diagnostic confidence. 287 EI SLPs from 23 states responded to survey questions about experiences, beliefs, and confidence in diagnosing autism. Results indicated overwhelming confidence in their ability to identify autism. However, confidence in their ability to diagnose autism was much lower. Greater awareness of diagnosis as within our scope of practice, promoting autism acceptance, and access to diagnostic experts and tool training would reportedly increase confidence.

### **Exploring Balance and Coordination Skills in Autistic Children Using String-Pulling and Motor Assessment Tasks**

*Presenter(s): Zoey Proper*

*Faculty Mentor(s): Allison Gladfelter*

*Session Time: 10 to 11a.m. Poster #114*

*Research Rookie*

Although autism is one of the most common developmental disabilities among American children (1 in 36 children; CDC, 2023), the etiology of autism remains unknown. The cerebellar sensitive period hypothesis of autism suggests that a perinatal cerebellar disruption may lead to differences in motor and social skills. Understanding neural differences in manual and speech-motor skills can help develop better assessments and therapies. Previous autism research relied on the placement of physical markers, which could cause sensory overstimulation. The present feasibility study explored the use of DeepLabCut, a video analysis software, to measure speech and bimanual coordination in autistic and non-autistic children using sentence repetition and string-pulling tasks. Six autistic and six non-autistic children successfully participated. Additionally, the results indicate that DeepLabCut was able to extract kinematic (movement) data from all participants. In summary, this methodology is viable for exploring coordination skills and cerebellar function of autistic and non-autistic children.



### **NIU Meal Prep Program**

*Presenter(s): Kayln Ross and Shonte Patterson*

*Faculty Mentor(s): Melanie Duffrin*

*Session Time: 1 to 2p.m. Poster #103*

College students report being too busy with schoolwork, long classes, work schedules and social activities to make time to eat well. They tend to participate in undereating or overeating due to stress and are often confused on how to nourish their bodies as first-time individuals to be living on their own. Overeating and undereating can significantly impact a students' ability to perform well academically, and therefore affect their ability to obtain their degree. The NIU Meal Prep Program is a free program accessible by all NIU students that utilize vegetables from Edible Campus to create fun recipes in the kitchen at Wirtz hall. The purpose of the Battle of the Meal Prep is to increase the awareness of this program, increase basic knowledge about the health benefits of recipes and how to navigate the kitchen, decrease social isolation and promote enjoyment around cooking.

### **Male students' Perceptions in an Undergraduate Nursing Baccalaureate Program: A Qualitative Review**

*Presenter(s): Jonas Arvin Sales*

*Faculty Mentor(s): Cristan Sabio*

*Session Time: 9 to 10a.m. Poster #107*

*Honors Capstone*

Nurses are a cornerstone in delivering patient care in the healthcare field. Traditionally perceived as a profession only for women, nursing has become in demand with many avenues for professional growth, especially in the United States (U.S.) with its growing population (Arif et al.; S., 2017). This growth in the U.S. brings forth healthcare and sociodemographic disparities, increasing the demand for nurses (Flaubert J. et al., 2021). This paper investigates the attitudes and perceptions of male undergraduate nursing students enrolled in the School of Nursing at Northern Illinois University concerning their education and role in healthcare. This study uses individual interviews and qualitative analysis to discern reasons behind the underrepresentation of men in nursing and provides recommendations that allies can approach to support men in nursing. This knowledge can contribute to understanding male nursing students' challenges in their educational and professional careers, alleviate nursing shortages, and enhance workforce diversity.

### **The Influence of Support Systems and Community Engagement on Black Maternal Health Outcomes**

*Presenter(s): Malila Sai*

*Faculty Mentor(s): Shondra Clay*

*Session Time: 2 to 3p.m. Poster #125*

*Research Rookie*

This comprehensive review examined the impact of support systems and community engagement on the maternal health outcomes of Black women. The guiding research

questions were: (a) How are support systems and community engagement characterized in the context of Black maternal health? and (b) What impact do these factors have on Black maternal outcomes? This study synthesized eleven current articles identified through search terms including Black maternal health, community support, and engagement. The articles comprise a mix of quantitative (n = 6), qualitative (n = 4), and mixed methods (n = 1) studies. The findings reveal a relationship between community-based support systems and improved maternal health outcomes among Black women. These outcomes include reduced rates of preterm birth, low birth weight, and enhanced overall birth experiences. The literature underscores the role of culturally congruent care and community advocacy in mitigating the adverse effects of systemic healthcare disparities faced by Black mothers.

### **Supporting Families After the Loss of a Parent**

*Presenter(s): Katherine Smail*

*Faculty Mentor(s): Jane Rose Njue and Xiaolin Xie*

*Session Time: 2 to 3p.m. Poster #111*

A significant percentage of children in Western societies will experience the death of a parent, and this issue is considered a significant public health concern. Of those who have experienced the loss of a parent, many will experience depression or other mental health problems following the loss. I created a parent program for adults who have experienced the loss of their partner/spouse. The goal of this program is to improve the children and family's wellbeing by guiding bereaved parents through positive and effective communication and parenting strategies following the loss of their partner. In this program, the caregivers will be guided through how to support their family in their new normal.

### **Access DeKalb: Website Review of Disability Inclusion at Local Fitness Centers**

*Presenter(s): Alassane Twillie*

*Faculty Mentor(s): Deana Herrman*

*Session Time: 11 to noon Poster #130*

Access to fitness clubs is an important factor when considering the health and well-being of persons with disabilities (PWD). Access Dekalb is an initiative aimed at improving the structure of fitness clubs in the Dekalb County community with intentions of improving the physical health and well-being of residents with disabilities. This study reviewed fitness center websites (N=16) in Dekalb County using research team identified search terms related to disability services, inclusion, and accessibility. Overall, the results indicated that websites displayed limited resources relating to access and inclusion of PWD in Dekalb County. Information derived from this study will be utilized to inform the next step in working with fitness centers to improve access for PWD.

## **“Brain Games”: Neuroprotective Education and Cognitive Training for Healthy Older Adults**

*Presenter(s): Jamie Ward*

*Faculty Mentor(s): Jamie Mayer*

*Session Time: 1 to 2p.m. Poster #113*

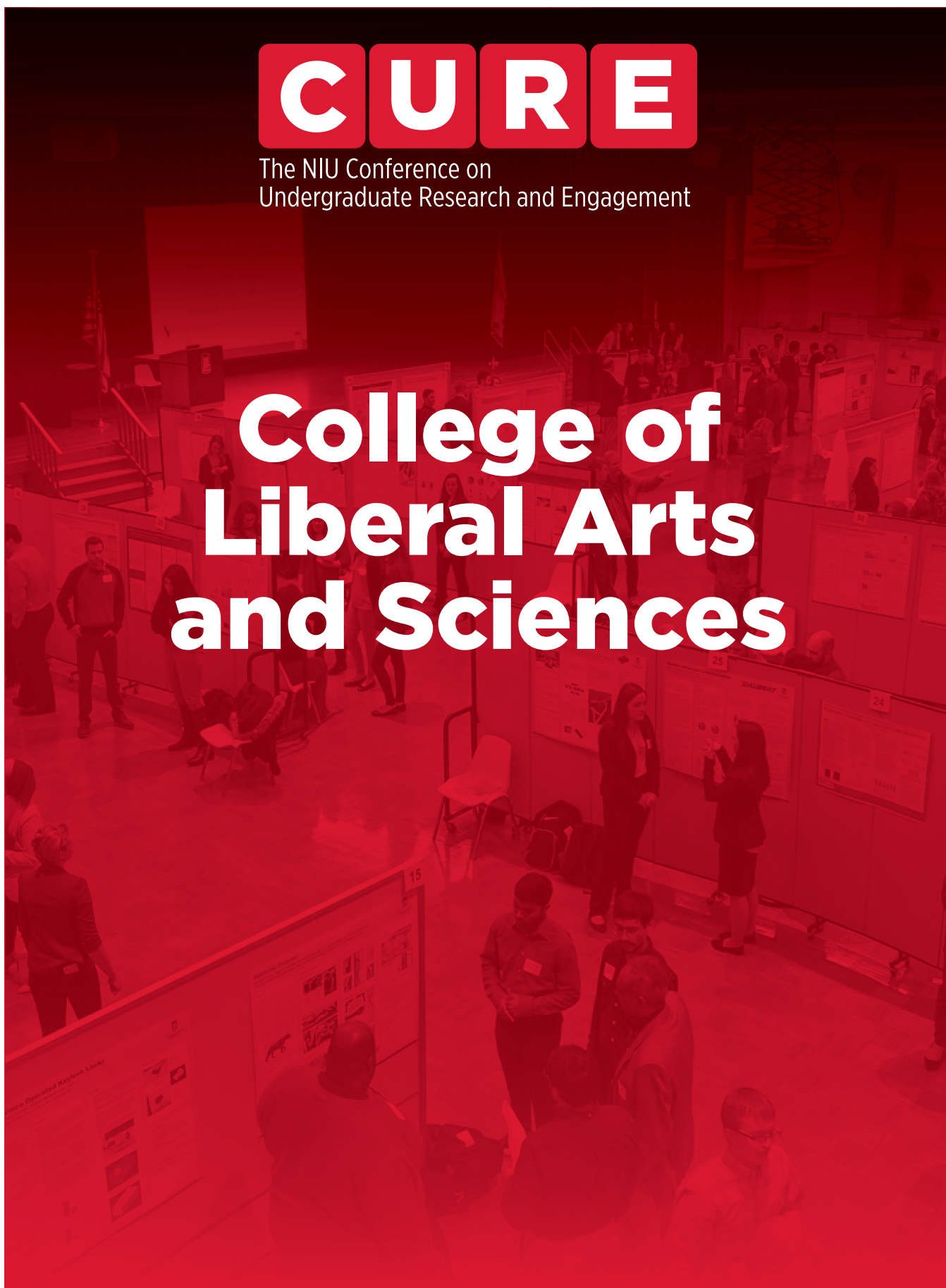
*Honors Capstone*

The prevalence of mild cognitive impairment (MCI) and dementia is increasing in line with the aging demographic. Keeping the brain active during aging is a critical component to counteracting effects of these neurodegenerative conditions by increasing cognitive reserve – i.e., the brain’s ability to deal with damage or change. This study examined the impact of regular cognitive stimulation and brain-based educational activities on memory and self-confidence in healthy aging adults residing in a local retirement community. Study participants enrolled in “Brain Games,” which involved weekly 60-minute sessions incorporating memory, word-finding, and attention tasks in addition to skill learning and social engagement over the course of two semesters. All participants completed a subjective memory questionnaire at baseline and following the first 10 sessions; a portion of participants also completed verbal fluency assessments. Preliminary data showed a modest positive increase in subjective memory and phonemic verbal fluency. More comprehensive memory testing in progress.



The NIU Conference on  
Undergraduate Research and Engagement

# College of Liberal Arts and Sciences





### **Exploring Early Language Acquisition Through English and French**

*Presenter(s): Rebecca Aguilar*

*Faculty Mentor(s): Matthew Smith*

*Session Time: 1 to 2p.m. Poster #106*

*Honors Capstone*

Knowing that there is no singular event that leads to learning a language, and factoring in the extent an individual's culture can affect language learning, this study emphasizes the importance of a cross-cultural approach to continue to broaden the scope of language acquisition research. The primary objective is to identify and analyze the critical commonalities in the initial stages of learning English and French as first languages through two major categories: phonology and culture. The project involves carrying out a scoping review of pertinent literature to highlight key findings, such as the overlap in speech sound development, signifying similarities in acquiring sounds in a typical order, and the effect cultural environments have on language use. Comparing the typical early processes across two languages may uncover insights that may shed light on potential biases and contribute to a more comprehensive understanding of language acquisition across linguistic and cultural contexts.

### **Understanding Civic Engagement through the Perspective and Experiences of Mixed-Status Latinx Students in Higher Education**

*Presenter(s): Alexandra Alcantar*

*Faculty Mentor(s): Christina Abreu*

*Session Time: 10 to 11a.m.*

*Poster #81*

*Honors Capstone*

This paper captures the perspectives and experiences of eight Latinx college-aged students from mixed-status families related to civic engagement. This paper identifies varied definitions of civic engagement and shows that students' experiences within their mixed-status families and their academic experiences shaped how they understood their level of civic engagement and informed their career paths. The eight oral history interviews conducted as part of this project show that most of the participants consider their level of political involvement as insufficient. Interviews reveal an understanding of "civic engagement" that exists on an evolving spectrum of participation. Participants shared that work responsibilities and family obligations made it difficult to participate civically, but student organizations actively encouraged them to become involved in advocacy or community-engaged activities.

### **The Effects of Prosocial Behaviors: The Roles of Apology Givers and Apology Receivers**

*Presenter(s): Lexie Alt and Isabelle Van Winkle*

*Faculty Mentor(s): Randy McCarthy*

*Session Time: 11 to noon Poster #23*

People are generally not good at admitting when they have done something wrong, and less so at apologizing for their wrongdoing. This can be for any number of reasons. In

fact, related evidence on similar prosocial behavior, in this case, apologies, shows that prosocial behavior givers are worried about how the behavior will be perceived by the prosocial behavior receiver (Epley et al., 2023). It is hypothesized that apologizers worry more about awkwardness and competence of an apology, whereas receivers are more concerned with the sincerity and warmth of an apology. To study this, participants were randomly assigned to the role of apologizers and receivers and were asked to rate how awkward it would be to either give or receive an apology. The findings of this study showed that apology receivers care less about how awkward an apology is and more about the action of receiving an apology.

### **Atypical Variations Within the Deep Gluteal Region: A Cadaveric Case Report**

*Presenter(s): Skylar Arwood*

*Faculty Mentor(s): Kara Coffman-Rea*

*Session Time: 9 to 10a.m. Poster #41*

Anatomical variations related to the sciatic nerve and its surrounding structures are well-documented, relevant for certain medical procedures, and identified as contributors to pathological conditions. Variations of the sciatic nerve are often classified by its relative position to the piriformis muscle. However, there are inconsistencies in the description and depiction of these variations, along with instances of atypical variations that do not fall within any specific classification. This case report describes an anatomic abnormality found during a routine cadaver dissection involving the bilateral presence of a double piriformis, absence of sciatic nerve formation (tibial and common fibular nerves never within a shared sheath) and an atypical course of the inferior gluteal vessels perforating the right tibial nerve. Documentation of atypical anatomy can help improve treatment and diagnosis.

### **Drawing While Reading to Enhance Learning**

*Presenter(s): Maggie Assam*

*Faculty Mentor(s): Anne Britt*

*Session Time: 11 to noon Poster #35*

To help students read their college textbooks on their own, this study explores how to help them create visual representations relating to the texts in PSYC 102 (Introduction to Psychology). This is part of a larger concern to find ways to support discipline-specific reading. Recently, PSYC 102 underwent a redesign to enable students to engage in discipline-specific thinking. These modifications entailed students taking on more responsibility for textbook learning independently. The aim of this study was to investigate strategies to support students in the redesigned course. Students read a passage and subsequently create a drawing and/or a casual model to aid comprehension. After the study, participants completed a six-point survey evaluating their self-efficacy (confidence in using drawing), perceived value (significance drawing held to them), and cost (time and effort to draw) of the method. Data collection is continuing. If results are promising, drawing may be incorporated into the course in future iterations.

### **Climate Change and Harmful Algal Blooms: A Comprehensive Review**

*Presenter(s): Benjamin Boyer, Kevin Pike, and Ivan Torres*

*Faculty Mentor(s): Pallavi Singh, Melissa Lenczewski, and Tomoyuki Shibata*

*Session Time: 2 to 3p.m.*

*Poster #75*

This review investigates the relationship between climate change and harmful algal blooms (HAB), focusing on their increasing impact on aquatic ecosystems and human health. Recognizing gaps in current knowledge, the study aims to clarify the specific mechanisms linking climate change factors like warming temperatures, CO<sub>2</sub>-driven acidification, and co-occurring stressors to HAB occurrences. The hypothesis suggests that climate change exacerbates HAB dynamics globally. Methodologically, the review integrates findings from diverse research papers and employs quantitative analyses to assess trends in HAB severity over time. Potential limitations, such as data availability and spatial coverage, are addressed through robust data validation techniques. Preliminary results indicate a significant correlation between climate change indicators and intensified HAB events, supporting the hypothesis. These findings contribute substantially to understanding climate change's impact on HABs, emphasizing the need for proactive management strategies to mitigate associated risks and protect aquatic ecosystems and human well-being.

### **Environmental Impacts on Fitness and Reproductive Capacity of *Arabidopsis thaliana* Mutants**

*Presenter(s): Benjamin Boyer and Maya Diaz*

*Faculty Mentor(s): Bill Martin*

*Session Time: 11 to noon*

*Poster #74*

The research involved collecting data from digital images of *Arabidopsis thaliana*, a genetic model plant, as part of the unPAK CURE network investigating phenotypic effects of T-DNA insertion mutations. The unPAK network is a research collaborative exploring the phenotypic effects of these mutations under different nutrient environments. Plants were grown under varied nutrient environments (high and low temperature) at the University of Charleston in South Carolina and photographed at three developmental phases: 17 days old, 28 days old, and at the end of plant reproduction. Plant diameter and fruit number were measured to quantify fitness differences between closely related mutant pairs using ImageJ, an open-source imaging software. The study aims to provide insights into phenotypic plasticity and reaction norms of targeted *Arabidopsis* mutant pairs, with implications for predicting and managing plant responses to environmental changes in agriculture and conservation.

### **Elevated Gene Expression in Response to Insoluble Phosphate in the Growth of *Pseudomonas 20ei1* Bacteria**

*Presenter(s): Vaidehi Brahmbhatt*

*Faculty Mentor(s): Scott Grayburn*

*Session Time: 10 to 11a.m.*

*Poster #50*

*Student Engagement Fund*

There is a limited supply of water-soluble phosphate fertilizer for agricultural use. However, some bacteria can transform insoluble phosphate into soluble phosphate. Our research problem is to study genes that are involved in this transformation and are expressed for the utilization of the insoluble phosphate. We grew bacteria in media that contained either soluble or insoluble phosphate. Bacterial RNA was isolated from cells grown in both media and the expression of key genes identified in the literature was studied using quantitative real-time PCR (qPCR). Key findings were that (1) genes for the PQQ (pyrroloquinoline quinone) cofactor were expressed at similar levels in both growth conditions, and (2) enhanced expression of pqqL and PQQ-dependent sugar dehydrogenase genes was observed in cells grown in the insoluble phosphate medium. The next steps will continue qPCR studies and media optimization, and the bacteria will be tested for enhancement of plant growth.

### **The Relationship Between Test Anxiety Symptom Types and Students' Self-Esteem**

*Presenter(s): Phil Braun*

*Faculty Mentor(s): David Valentiner*

*Session Time: 11 to noon                      Poster #39*

Students taking tests fall into two categories: those low in test anxiety and those high in test anxiety. It has been found that within the high test anxiety subcategory students fall into one of two additional categories: those whose anxiety is related to cognitive interference (the general feelings of anxiety: intrusive thoughts, worry) and those who have a negative self-perception of their test-taking abilities (believing they cannot perform well on tests and that as such they are doomed to failure). It has also been shown that there is a negative correlation between one's self-esteem and the level of test anxiety (as one's self-esteem decreases their test anxiety increases). This study looks to further examine these two factors exploring the differences in self-esteem within these two subgroups. Using t-test comparisons, the project seeks to confirm if those with high levels of negative self-perception will report poorer self-esteem than those who solely report cognitive interference.

### **Trauma Type, Resilience and Sense of Self**

*Presenter(s): Caitlin Callahan*

*Faculty Mentor(s): Holly Orcutt*

*Session Time: 10 to 11a.m.                      Poster #31*

*Honors Capstone*

Most individuals will experience at least one traumatic event in their lifetime (Alim et al., 2008), potentially leading to a diagnosis of Post-Traumatic Stress Disorder. PTSD can have significant psychological and physical repercussions (Brady et al., 1997). Experiencing trauma, whether interpersonal or non-interpersonal, can impact resiliency and sense of self negatively. The current study hypothesized that participants who reported interpersonal trauma as their worst event would report lower resilience and sense of self compared to participants reporting a non-interpersonal trauma. 429 undergraduate students were given questionnaires to assess traumatic experiences,

resiliency, and sense of self using established scales. A MANOVA was conducted and yielded no statistically significant differences between resiliency and sense of self across interpersonal and non-interpersonal worst events. This study finds evidence of similar resiliency and sense of self reports across trauma types and discusses how these groups may differ in more detail.

### **Correlation of Somatic Anxiety Symptoms with Negative Self-Perception in Students with Acute Test Anxiety**

*Presenter(s): Lilliana Campbell*

*Faculty Mentor(s): David Valentiner*

*Session Time: 1 to 2p.m. Poster #33*

*Research Rookie*

Test anxiety is a significant concern impacting students' academic performance and well-being. Responses to the cognitive test anxiety questionnaire often separate into two distinguishable factors for individuals with high levels of test anxiety: cognitive interference and negative self-perception (Cassidy & Finch, 2015). This study focuses only on participants who have above-average test anxiety. Based on responses to the cognitive test anxiety scale, this study compares participants who report high scores of negative self-perception to participants who report high scores of cognitive interference symptoms during tests. It is theorized that students who score higher on negative self-perception will have significantly worse grades and performance on standardized tests than the students who only report high scores of cognitive interference symptoms. Targeted interventions and support systems can be developed to address the specific needs of affected students, ultimately promoting academic success and mental health in college settings.

### **Antagonism Reduces the Effect of Childhood Polyvictimization on reported Psychological Distress in Adulthood**

*Presenter(s): Benjamin Carsten*

*Faculty Mentor(s): Holly Orcutt and Travis Cole*

*Session Time: 1 to 2p.m. Poster# 38*

*Honors Capstone and Senior Thesis*

The cumulative effects of childhood maltreatment (CM), or *polyvictimization*, are associated with increased distress. Personality traits moderate the association between trauma and distress. The present study administered questionnaires to undergraduate students (N = 485). We hypothesized that: 1) Negative Affectivity (NA), Detachment, Disinhibition, Antagonism, and Psychoticism would be significantly positively correlated with distress; 2) the personality trait domains of NA, Detachment, and Psychoticism would moderate the relationship between polyvictimization and psychological distress, and; 3) the positive correlation between polyvictimization and distress would be significantly stronger than the positive correlation between total scores on the Childhood Trauma Questionnaire and distress. Results indicated that all personality traits positively correlated with distress. Multiple-regressions models indicated significant positive interactions for polyvictimization with NA and Antagonism on distress. Support for the



third hypothesis was not found. The positive moderation effects suggest that higher levels of NA and Antagonism increase the impact of polyvictimization on distress.

### **Childhood Sexual Abuse and the Role of Experiential Avoidance in College Alcohol Use**

*Presenter(s): Regina Montes Castellanos*

*Faculty Mentor(s): Holly Orcutt*

*Session Time: 10 to 11a.m.*

*Poster #7*

*Honors Capstone*

Few studies have focused on the relationship between Childhood Sexual Abuse (CSA) and alcohol use. Moreover, experiential avoidance has been shown to be an important factor in poor behavioral outcomes in young adults with a history of childhood trauma. This study explores experiential avoidance as a mediating factor of the relationship between CSA and alcohol severity in college students. Data for this investigation was collected as part of a larger study, with a sample of 438 participants. Results show that there was a significant indirect effect of CSA on past year severity of alcohol related problems through experiential avoidance,  $B = .04$ , 95% CI [.01, .07]. Thus, results support the potential role of experiential avoidance as a mediating factor between CSA and alcohol-related problems. Future research should conduct longitudinal studies that look at these constructs over time. Shifting our focus to interventions addressing experiential avoidance is also proposed.

### **Creating Documentation and Continuity for Northern Star Staff**

*Presenter(s): Rachel Cormier*

*Faculty Mentor(s): Laura Vazquez*

*Session Time: 10 to 11a.m.*

*Poster #135*

*Honors Capstone*

This project aims to create a guide to inform the various roles and practices at the Northern Star to ensure that high standards are upheld. The guide will address the duties and responsibilities of editors, reporting practices, style guides, and multimedia practices including for photography and video departments.

### **Flotillin 1 is Required for the Polarized Deposition of Basement Membrane Proteins in Epithelial Cells**

*Presenter(s): Vana Dakarian*

*Faculty Mentor(s): Olivier Devergne*

*Session Time: 1 to 2p.m.*

*Poster #61*

*McKearn Fellowship and Student Engagement Fund*

Epithelial tissue is among the most abundant tissues found in human beings, composing the skin and mucous membranes, lining body cavities and hollow organs, and assisting in hormonal, sensory, and excretory functions. Epithelial cells are characterized by their organized architecture. The basement membrane (BM) is an essential component of epithelial architecture that lines one side of epithelia. This

research focuses on Flotillins: well-conserved genes involved in proper placement of BM proteins by the epithelial cells to form the BM. Flotillin 1 was recently identified as having a significant role in BM protein secretion. To study the epithelial polarized architecture and the secretion of BM proteins, the follicular epithelium of the *Drosophila melanogaster* ovary is used. The project sheds light on the mechanisms important for proper BM placement and epithelial architecture, which will impact our understanding of various diseases caused by the loss of epithelial structure in humans including cancers.

### **CURE Digital**

*Presenter(s): Maya Diaz*

*Faculty Mentor(s): Bill Martin*

*Session Time: 11 to noon*

*Poster #66*

This research collected data from digital images of *Arabidopsis thaliana* as part of the unPAK CURE network. The unPAK network is a research collaborative investigating the phenotypic effects of T-DNA insertion mutations in this genetic model and plant. The plants were grown under varied nutrient environments (high and low) at the University of Charleston in South Carolina and photographed during growth. Digital images captured plant growth at three developmental phases: 17 days, 28 days and at the end of plant reproduction. Measurements of plant diameter at the two timepoints and reproductive capacity, approximated by fruit number, aimed to quantify fitness of closely related, mutant pairs. ImageJ, an opensource imaging program, aided in data capture from digital images. The anticipated findings provide insights into the phenotypic plasticity and reaction norms of targeted *Arabidopsis* mutant pairs. These observations have implications for predicting and managing plant responses to environmental changes, impacting areas ranging from agriculture to conservation.

### **Sabotage in Food and Agriculture**

*Presenter(s): Ava Divizio*

*Faculty Mentor(s): Brenden Swedlow*

*Session Time: 9 to 10a.m.*

*Poster #98*

*Research Rookie*

This project researches the risk assessment and regulation methods of the U.S. federal, Illinois, and local governments regarding the risk of sabotage in the food and agriculture sector. This information is important to understand as it serves to demonstrate what steps the government will take to mitigate the effects of an attack. Analysis of peer review journals and qualitative data from governmental documents reveal that these three levels of government take charge in ensuring that they provide their best efforts for safety in their respective spheres. This is accomplished through statutes, laws, private entities, and even local police departments. Overall, the intergovernmental and intragovernmental regulations of the United States mitigate threats caused by sabotage and terrorism in both agricultural and neighborhood communities.

## **The Vagina, More than a "Penis Receptacle": Sexual Function Representations in Anatomy and Physiology Textbooks**

*Presenter(s): Stephanie Drendel*

*Faculty Mentor(s): Heather Bergan-Roller*

*Session Time: 11 to noon*

*Poster #63*

A healthy understanding of sexual function is crucial for physiological and psychological well-being. What undergraduate students learn in their biology courses shapes the way they engage with these topics. Anatomy and Physiology (A&P) courses attract future healthcare practitioners who need to be able to communicate with their patients about sexual function in an inclusive manner. This study conducted a national survey to identify the most utilized A&P textbooks for undergraduate students, then used emergent thematic analysis on the resulting 14 textbooks to characterize how sexual function is represented. The vagina was often described as having three main functions: a "receptacle for the penis," an "outlet for menstrual flow," and "the passageway for childbirth." This exemplifies women's sexual function being described in textbooks with a heteronormative, reproductive, and male-centric focus. A more holistic depiction of women's sexual function is necessary for students to garner a full, healthy comprehension of the topic.

## **Seeing Clear with Fear: Gender Variation in Perception and Change Detection**

*Presenter(s): Camie Dziadosz, Rebecca DeFamio, and Tiffany Yoo*

*Faculty Mentor(s): Katja Wiemer*

*Session Time: 2 to 3p.m.*

*Poster #18*

Individuals often fail to notice changes in their surroundings. Change blindness is influenced to some extent by culture (Masuda & Nisbett, 2006) and gender (Davies & Hine, 2007). We are also more likely to detect threatening stimuli, like snakes (Kawai & Qui, 2020). This study tested the influence of gender on change detection in unsafe scenes. Given that unsafe environments, such as dark urban settings, are more unsettling for women (Tandogan & Ilhan, 2016), we predicted that they detect changes in these environments more quickly. A flicker paradigm presented changes in scenes rated as safe or scary to undergraduate participants (13 women, 8 men). While not statistically significant due to the small sample, an ANOVA of only trials with accurate change detection, revealed a pattern consistent with our hypothesis: In contrast to men, women were faster to detect changes in the scary scenes relative to the safe scenes.

## **The Effect of Light Regimes on Chlorophyll d Photosynthesis**

*Presenter(s): Aya Elamin*

*Faculty Mentor(s): Wesley Swingley*

*Session Time: 10 to 11a.m.*

*Poster #71*

*Research Rookie*

Cyanobacteria were among the first organisms to carry out oxygenic photosynthesis. Although all cyanobacteria contain chlorophyll *a*, *Acaryochloris marina* is a species of cyanobacteria that produces chlorophyll *d* as its primary photosynthetic pigment. In this

study, we examine how different light regimes influence Chlorophyll *d* photosynthesis compared to Chlorophyll *a* photosynthesis. Two strains of cyanobacteria, one with Chl *d* as their primary pigment and one that lacks Chl *d* were placed in three different light conditions: white light, far-red light, and light stress. Their growth was analyzed by spectrophotometry and pigment composition by HPLC analysis. Results indicate that the light stress affects photosynthesis efficiency, but cyanobacteria show acclimation over a period of time. This finding is crucial in the discovery of Chl *d* biosynthesis pathway, which could allow for the creation of plants that do not need visible light for photosynthesis. This could potentially lead to increased food production.

### **Decrease in Christian Church Membership**

*Presenter(s): Destiny Ervins*

*Faculty Mentor(s): Mark Schuller*

*Session Time: 11 to noon*      *Poster #16*

*Senior Thesis*

Christian churches have been a sizable component of American religion for centuries. However, there has been a noticeable decline in Christian church membership attendance rates. This study will present reasons for said decline and suggestions for repairing membership rates.

### **Parent-adolescent conflict in relation to self-esteem, physical victimization, and relational victimization: Are the effects moderated by gender?**

*Presenter(s): Anahi Estrada and Mercedes Hernandez*

*Faculty Mentor(s): Nina Mounts*

*Session Time: 9 to 10a.m.*      *Poster #22*

Parental conflict about peers rises as adolescents spend more time with peers and as they develop autonomy (Bray et al., 2022). Previous research suggests that higher levels of parent-adolescent conflict was related to poorer self-esteem (Wu et al., 2023) and increases in alcohol usage over time (Bray et al., 2022). In this investigation, parent-adolescent conflict about peers was examined using the following questions. First, are there gender differences in the major variables? Second, is age related to the major variables? Third, is parental conflict about peers related to self-esteem, physical victimization, or relational victimization? Finally, are these relationships moderated by child gender? Adolescents completed scales that assessed parent-adolescent conflict about peers (Mounts, 2007), global self-worth (Harter, 1988), and physical aggression and relational aggression (Crick & Grotpeter, 1996). There were no significant mean differences for child gender for any of the variables of interest. Higher age was related to lower self-worth and higher conflict about peers. Higher conflict about peers was related to lower global self-worth. There was a significant interaction effect with conflict about peers and physical victimization such that higher conflict was related to higher physical victimization. A similar effect was found for relational victimization.

### **The Protective Effect of Music Against Social Stress in Prairie Voles**

*Presenter(s): Sydney Fields*

*Faculty Mentor(s): Angela Grippo*

*Session Time: 2 to 3p.m. Poster #3*

Social stressors disrupt physiology and behavior, including by increasing heart rate and anxiety in humans. Listening to music might mediate these changes. This study investigated stress responses after exposure to music in socially isolated prairie voles. Prairie voles display social behaviors like humans, including stress after social isolation. Adult prairie voles were socially isolated from a sibling for eight weeks. During the last four weeks, the experimental group listened to 30 minutes of selected instrumental music clips twice weekly, while the control group had ambient noise. An open field test measured anxiety-related behaviors, and heart rate served as an index of cardiac reactivity. The music-exposed condition (vs. ambient noise) exhibited reduced anxiety behaviors in the open field and lower heart rate after the open field, suggesting music had a protective effect against social isolation stress. This research informs our understanding of treatments for stress in humans.

### **Determining the Prevalence of Salmonella in Wild and Domesticated Bison**

*Presenter(s): Mark Figueroa*

*Faculty Mentor(s): Pallavi Singh*

*Session Time: 2 to 3p.m. Poster #77*

*Student Engagement Fund*

*Salmonella* is a widespread pathogen that can cause gastrointestinal tract infections in humans. Infections in humans can occur through the increased consumption of bison. Bison intestines can be reservoirs, therefore intestinal microbiome may be an important factor in *Salmonella* colonization. This project aims to determine the prevalence of *Salmonella* from different managements and unravel potential risks associated with pathogen spread. Bison fecal samples were collected seasonally from four sites for two years. These samples were incubated in R-10 broth for 48 hours followed by TTB broth for another 48 hours at 37°C. The broth was then spread onto BG and SS agar plates for selective *Salmonella* growth. Presumptive *Salmonella* colonies were confirmed through polymerase chain reaction using target gene-specific primers. Future studies will evaluate management practices, seasonal variation, and comprehensive analysis of the bison intestinal microbiome. The results from this project will provide information to develop improved food safety measures.

### **Why is Training Raters So Hard? Exploring the Effects of Engagement During Training Sessions**

*Presenter(s): Jonathan Ford*

*Faculty Mentor(s): Kara Styck*

*Session Time: 2 to 3p.m. Poster #11*

Direct behavior rating scales assess student classroom behavior. They are, however, prone to differential rating between raters. Research on rater training is inconclusive;



thus, the present study will pose the question: Does rating consistency/accuracy increase when participants are actively engaged in training? A sample of 23 graduate students across three universities were randomly assigned to receive rater training (n = 11) or not (n = 12), then asked to rate video clips of students at two time points. Participant engagement was assessed by the accuracy of their practice ratings during training. Consistency will be evaluated using Pearson product-moment correlations between Time 1 and Time 2 ratings for actively engaged participants and non-engaged participants. Correlations between ratings will be compared with systematic direct observation data for accuracy. Analyses are currently ongoing and will be presented at CURE. Since these scales help identify resource-entitled students, their consistency/accuracy is vital.

### **Mentors for Sustainable Success**

*Presenter(s): Bianca Galicia and Itzel Sanchez*

*Faculty Mentor(s): Mark Schuller*

*Session Time: 1 to 2p.m.*

*Poster #4*

*Senior Thesis*

Mentoring programs are a prominent strategy in the United States for preventing negative outcomes and promoting resilience among at-risk youth. This research explores the key components of running sustainable mentoring programs in DeKalb County. It involves surveys of students, administrators, and local nonprofit organizations with mentoring programs to identify effective programming. By comparing the trends of the different programs and surveying the different groups it can be determined in which ways mentoring programs can be strengthened and sustained. The results revealed an inconsistency among all the groups regarding what is needed when creating a sustainable mentoring program in the City of DeKalb.

### **Generating pH Dependent Anti-Caffeine VHH Antibodies through the Introduction of Ionizable Histidine Residues Within the Homodimeric Interface**

*Presenter(s): Anna Gavin*

*Faculty Mentor(s): James Horn*

*Session Time: 11 to noon*

*Poster #69*

The generation of pH-dependent therapeutic antibodies can enhance their effectiveness in treating disease. Such pH-dependent antibodies are generated through the introduction of ionizable residues within the binding interface. This project seeks to better understand the fundamental driving forces that govern the pH sensitivity. To determine the extent that ionizable histidine residues may affect pH-dependent binding, histidine residues were independently introduced within the interface of a homodimeric anti-caffeine VHH model system. The variants were expressed in bacteria and purified. Finally, the binding constants of the different anti-caffeine histidine variants were determined by isothermal titration calorimetry, which measures the heat released upon binding. Of the four histidine variants studied, mutation S35H displayed at least a 100-fold change in binding constants with a drop in pH, with only a modest loss of affinity binding at neutral pH.

### **The Psychological Effects of a Brief BDSM Experience**

*Presenter(s): Zoey Glos*

*Faculty Mentor(s): Brad Sagrin*

*Session Time: 11 to noon*

*Poster #2*

BDSM comprises a number of consensual activities and relationship structures involving Bondage/Discipline, Dominance/Submission, and Sadism/Masochism. Most research on the effects of BDSM activities has focused on longer form activities lasting at least 30 minutes, leaving a gap in research on how participants react to short form BDSM activity. The goal of this study was to explore how BDSM Practitioners react to brief BDSM experiences and to examine potential changes in their emotional state before and after. This study took place at a BDSM conference in the Midwest, during an event called "Tapas" where attendees were invited to participate in a brief BDSM experience to "provide a taste" of a particular activity. Participants completed a short questionnaire before and after their participation in these activities. Data collection yielded a sample size of 138 participants and data analysis is ongoing.

### **The Use of Pseudomonas 20ei1 Bacteria to Kill Monoraphidium Dek19 Algae**

*Presenter(s): Brianna Glees, Ayesha Khan, and Haniel Mngodo*

*Faculty Mentor(s): Scott Grayburn*

*Session Time: 9 to 10a.m.*

*Poster #49*

*Student Engagement Fund*

Algae are usually beneficial and can produce oils to make biodiesel after the cells are broken. In areas of nutrient pollution, algae can cause harmful blooms that kill fish and other creatures. Pseudomonas 20ei1, previously isolated from the NIU lagoon, was found to kill multiple algae species. The research problem is to identify bacterial genes associated with the process of algae death. Bacteria were grown alone (axenic) and in the presence of algae (cocultures), then RNA was isolated. Quantitative real-time polymerase chain reaction, qPCR, experiments were used to study the expression of genes. Key findings were that multiple genes, including phenazine biosynthesis, showed enhanced expression in cocultures. This project identified genes in the bacterium Pseudomonas 20ei1 that may contribute to the death of Dek19 algae. The next steps in the project include the use of bacterial extracts to kill algae and recovering oil produced by the algae for biofuel.

### **Tug-of-War: Comparative Analysis of Prairie Vole and Mouse String Pulling Behavior**

*Presenter(s): Ashley Gonzalez*

*Faculty Mentor(s): Doug Wallace*

*Session Time: 1 to 2p.m.*

*Poster #13*

Rodents need fine motor control of their front limbs to interact with the environment, such as to gather food or make shelter. String-pulling behavior has been observed to depend on fine motor control, and general movement characteristics are conserved

across humans, rats, and mice. In this study, string-pulling behaviors were compared in mice and prairie voles, which are two rodent species that differ in body shape, natural habitats, and social behaviors. Six prairie voles and six mice were examined across five days, with three trials each day. Time to approach, pull, and the number of string contacts were used to quantify string-pulling behavior. Because prairie voles and mice differ in several anatomical features and behaviors, future studies may explore the implications of manipulating social bonds in rodent models of neurological conditions such as strokes. This research provides valuable insights into species differences in fine motor control.

### **A Review of Current Knowledge on 1,4 Dioxane in Groundwater**

*Presenter(s): Ian Halterman and Benjamin Osborne,*

*Faculty Mentor(s): Melissa Lenczewski*

*Session Time: 11 to noon                      Poster #101*

1,4-Dioxane is an organic compound commonly used as an industrial solvent. It is also found in consumer products like cosmetics, shampoos, and body washes. The EPA considers 1,4 dioxane as a contaminant of emerging concern due to it being a potential carcinogen and causing harm to the livers and kidneys when ingested. Currently 1,4 dioxane disposal is underregulated and it is continually released into the environment polluting water resources, specifically groundwater. Due to 1,4 dioxane's chemical properties, mainly its high solubility, it can spread rapidly in the environment. As a result, groundwater remediation is an issue because standard remediation techniques do not work on it. This study is a review of the fate and transport of 1,4- dioxane especially in groundwater settings. One of the findings is that 1, 4-dioxane and trichloroethylene have a strong correlation between the two chemicals; however, little is still known about this compound and more research and regulation are needed.

### **Perpetual Parasites: Trematode Survival Following Snail Death**

*Presenter(s): Grant Hattendorf*

*Faculty Mentor(s): Jennifer Koop*

*Session Time: 1 to 2p.m.                      Poster #79*

Invasive species, like the freshwater faucet snail (*Bithynia tentaculata*), pose significant ecological and economic threats. These snails serve as hosts for parasitic trematodes, that when consumed by waterfowl, can cause death. This study examines the impact of desiccation-induced snail mortality on the viability of trematode metacercariae (a late developmental stage of the parasite). By assessing whether metacercaria remain viable even after host death, we will be better able to understand parasite transmission dynamics within this system. Faucet snails were collected from the upper Mississippi River in 2022 and housed in the lab at NIU. Twenty adult snails were then removed from the water and subjected to desiccation for a varying number of days. After this period, snail survival and trematode viability (survival) were assessed. Results show a negative relationship between desiccation time and metacercariae viability. Despite this relationship, viable metacercariae were still found in snails subjected to 14 days of desiccation, highlighting their resilience.

## **The Computational Search for Unidentified Central Configurations of the Newtonian N-Body Problem**

*Presenter(s): Hannah Havel*

*Faculty Mentor(s): Chris McCord*

*Session Time: 10 to 11a.m.*

*Poster #151*

The N-body problem, first proposed by Isaac Newton, is a field of study in mathematics and physics involving predicting the motion of particles under mutual gravitational attraction. It is vital in celestial mechanics, such as planning collision-free satellite orbits. Within the field, bifurcation candidate energy levels indicate potential quantitative changes to the solutions of equations of motion. They depend on "central configurations"; arrangements of particles on a three-dimensional coordinate system. Thus far, configurations for up to seven *equal* masses have been confirmed. For eight through ten equal masses, and cases of unequal masses, not all are confirmed. The project utilizes an existing computer algorithm that has identified possible central configurations for up to seven equal masses. We can manipulate the program, comparing output to theory and accepted knowledge. With further understanding of these cases, we can come closer to understanding the dynamic behavior of these particle systems.

## **Prosocial Teasing Prevalence: Who are the Teasers and Who are the Targets?**

*Presenter(s): Amanda Heringa*

*Faculty Mentor(s): Christine Malecki*

*Session Time: 9 to 10a.m.*

*Poster #10*

Prosocial teasing is a playful way of interacting that occurs for friendship, fun, romantic interest, and increasing social status (Beck, 2007; Podnar 2013). The present study focused on the following questions about college students: 1) To whom is prosocial teasing targeted most? 2) Are there differences in the form (physical or verbal) when directed towards a romantic interest? and 3) Does prevalence differ among college majors? Approximately 630 undergraduate students completed a self-report survey and the Novel Prosocial Teasing questionnaire on Qualtrics. We found that prosocial teasing by both men and women is directed most towards friends. Further, verbal teasing towards romantic interests is more common than physical. There were no significant differences in prosocial teasing among the three major categories (Hard Sciences, Business, and Social, Humanities, Education, and Health). This research illustrates needed information about prosocial teasing prevalence in college students.

## **Unraveling the Influence: Key Factors Shaping Microplastic Degradation Dynamics**

*Presenter(s): Giselle Hernandez, Ngun Par and Boonyarak Chuanchit*

*Faculty Mentor(s): Melissa Lenczewski, Pallavi Singh, and Tomoyuki Shibata*

*Session Time: 10 to 11a.m.*

*Poster #96*

Microplastic (MP) pollution has emerged as a pressing environmental concern, with far-reaching implications for ecosystems and human health. This study aims to identify the current global status of microplastic pollution, the pathways by which microplastics enter water bodies, the factors influencing the breakdown process, and any analytical analysis through a comprehensive literature review. The result shows that MP degradation occurs through photodegradation, thermal degradation, mechanical degradation, biodegradation, oxidation, and chemical degradation. These degradation pathways are influenced by various factors, including pH, salinity, and the presence of organic matter. Various analytical techniques can be implemented to detect, quantify, and characterize the resulting particles. These methods include stereo microscopy, various types of spectroscopy, thermal analysis, etc. Understanding microplastic degradation is important for predicting the persistence, transport, and potential impacts of microplastics in various environmental compartments, as well as for developing strategies to mitigate their accumulation and potential risks.

**Cultivating Connections: Paleoethnobotanical Insights into Mississippian Lifeways at the Collins Site (c.1000-1150 AD)**

*Presenter(s): Jennifer Hernandez and Emma Bell*

*Faculty Mentor(s): Dana Bardolph*

*Session Time: 2 to 3p.m.*

*Poster #85*

*Student Engagement Fund and Research Rookie*

Paleoethnobotany is the study of plant remains from archaeological sites to provide insight into the relationship between ancient peoples and plants. This project presents a case study from the Collins site, a Late Woodland/Early Mississippian mound site dating to ca. 900 to 1200 AD in Vermillion County, Illinois. Late Woodland and Early Mississippian are archaeological terms for two converging societies characterized by intensive maize cultivation and stratified social hierarchy. The goal of this study is to understand the roles plants played in the transition to Mississippian lifeways at the Collins site. Plant remains including maize, nutshells, and other cultigens were recovered at Collins using flotation, a process used to separate soil and archaeological material, which were then identified under a microscope. These plants have documented uses as food, medicine, tools, and for religious ceremonies. Their ethnobotanical uses are interpreted via a database developed for this project featuring native regional flora.

**Establishing a Culture-based Method to Detect Bacterial Pathogen (*Clostridium perfringens*) in Bison**

*Presenter(s): Aleena Kallan*

*Faculty Mentor(s): Pallavi Singh*

*Session Time: 9 to 10a.m.*

*Poster #45*

*Student Engagement Fund*

Bison meat has become a lucrative food option due to its high protein content. However, it heightens the risk of pathogen transmission affecting human health. *Clostridium perfringens*, a zoonotic pathogen found in these animals, is known to induce



gastrointestinal infections. Noninvasive fecal sampling and targeted enrichment techniques, particularly using Reinforced Clostridial Medium in a 37°C CO<sub>2</sub> incubator, facilitate the growth of *Clostridium*. Followed by growth on 5% blood agar plates for 48 hours at microaerophilic conditions, along with molecular detection with pathogen-specific genes, led to the assessment of pathogen. Preliminary results from sampling conducted in the summer of 2023 yielded five positive detections of genes specific to *Clostridium*. Because bison have not been studied for *Clostridium* presence using culture-based methods, this novel approach to detecting and studying human pathogens will provide valuable insights to the scientific community and allow preventative measures to be taken to improve food safety standards.

### **Synthesis of a Common Intermediate for Selective Inhibitors of PDE4D**

*Presenter(s): Konur Kivisto*

*Faculty Mentor(s): Timothy Hagen*

*Session Time: 2 to 3p.m.*

*Poster #70*

The human phosphodiesterase 4 (PDE4) enzyme converts cyclic adenosine monophosphate (cAMP) to adenosine monophosphate (AMP). Inhibitors of this enzyme are marketed drugs for the treatment of COPD, atopic dermatitis, and psoriasis. There are four subtypes of the PDE4 enzyme, PDE4A, PDE4B, PDE4C, and PDE4D. Selective inhibitors of the PDE4D enzyme have been reported. Some of the disclosed PDE4D inhibitors have a benzothiazole core structure. This work covers the synthesis of a common intermediate for the synthesis of PDE4D selective inhibitors that contain the benzothiazole ring. The benzothiazole heterocycle was synthesized using a Huggerschoff reaction. The benzothiazole intermediate can then be converted in a few steps to the previously reported PDE4D inhibitors.

### **The Effect of Culture on Semantic Processing**

*Presenter(s): Christopher Koreba*

*Faculty Mentor(s): Katja Wiemer*

*Session Time: 1 to 2p.m.*

*Poster #1*

This study considers the effect of culture, in terms of collectivist or individualist, on individual preference in semantic processing. There are two methods of semantic processing: *Thematic* and *Taxonomic*. Taxonomic processing considers categorical relationships between concepts, i.e., “Car” and “Bus.” Thematic processing considers concepts on the basis of co-occurrence and complementary relationships within a given context or situation, e.g., “car” and “road.” Previous research has found that differences in cultural dimensions, i.e., individualist or collectivist, affect an individual’s perception of the environment (Nisbett and Miyamoto, 2005). Individual preference in semantic processing was measured via a novel word association task. Cultural dimensions were measured via a 14-item survey. It is predicted that participants who score higher as individualist will choose the taxonomic response-word more frequently relative to those who score higher as collectivist, and vice versa.

### **Examining Associations between Measures of Obsessive- Compulsive Disorders, Distress, and Worry in a Diverse Undergraduate Sample**

*Presenter(s): Tavio Lares, Benjamin Carsten, and Jonathan Teller*

*Faculty Mentor(s): Kevin Wu*

*Session Time: 10 to 11a.m.*

*Poster # 19*

The multifaceted nature of obsessive-compulsive disorder (OCD) underscores the importance of using robust assessment measures to accurately capture the diverse range of symptoms and experiences (Abramowitz et al., 2010). The current study aimed to examine empirical associations between obsessive-compulsive (OC) symptoms, obsessive beliefs, distress, and worry in a racially/ethnically diverse sample. We explored convergent and discriminant validity patterns to better understand the relationships among these constructs by examining a series of zero-order correlations. We sampled 3,684 students enrolled in Introductory Psychology courses who completed an online battery of questionnaires, including demographic information and measures of OC symptoms, obsessive beliefs, distress, and worry. The primary finding was that all the symptoms assessed were significantly associated with each other ( $p < .01$ ). However, measures of OC symptoms exhibited stronger associations with each other compared to their associations with measures of obsessive beliefs, anxiety, and worry. The stronger associations among OC symptom measures compared to their associations with related constructs demonstrate these measures' specificity in capturing OCD's heterogeneity and differentiating it from other disorders.

### **GIS Analysis Application of Flood Risk Map in Beijing, China**

*Presenter(s): Yuxuan Liu*

*Faculty Mentor(s): Wei Luo*

*Session Time: 1 to 2p.m.*

*Poster # 94*

*Honors Capstone*

This research proposal aims to utilize Geographic Information System (GIS) analysis to create a flood risk map for Beijing, China, a region prone to devastating floods due to its climate and topography. The proposal emphasizes the significance of flood risk management in Beijing, citing past flood events' severe impacts. Drawing on existing literature and methodologies, the research intends to integrate GIS, Python, and other methods to comprehensively assess flood risk factors and generate informative maps and graphs. This research seeks to enhance flood risk assessment methodologies, providing valuable insights for proactive flood management in Beijing.

### **Where There's a Snail there's a Way: Faucet Snail Behavior under Cooling Temperatures**

*Presenter(s): Ben Lunaburg*

*Faculty Mentor(s): Jennifer Koop*

*Session Time: 11 to noon*

*Poster #97*

Invasive species cause major financial damage annually and are one of the main causes of biodiversity loss. Faucet snails (*Bithynia tentaculata*) are an invasive species of freshwater snail that have spread across the Great Lakes region and the Mississippi

River. The snails are a host for trematode parasites that when consumed by waterfowl can be deadly. This study tests how temperature might affect the species' behavior. An experiment using two treatments was conducted, one in which snails were kept at a constant temperature (22°C) for eight weeks, and the other in which the temperature decreased every two weeks (22°C – 13°C). The activity level of 160 snails in each treatment was measured weekly. There was not a significant difference in activity levels nor survival between snails based on the treatment. Understanding this relationship can help us predict whether snails will be able to disperse to new habitats and survive, which can lead to better protection of waterfowl.

### **Cost of Skilled Labor and Market Uncertainty**

*Presenter(s): Melanie Lytell*

*Faculty Mentor(s): Anna Klis*

*Session Time: 9 to 10a.m.*

*Poster #20*

*Research Rookie*

Skilled labor is prevalent in the United States, and there is a cost to acquire this skilled labor. As this cost fluctuates, other aspects of the economy like consumer confidence, interest rates, the labor market, and the stock market, are impacted by fluctuations. The impacts of some of these variables have been shown on the cost of labor overall, or the cost of unskilled labor, but not the cost of skilled labor itself. Previous research has primarily focused on market uncertainty impacting the stock market. To understand the connection between the cost of skilled labor and economic indicators of uncertainty, literature was examined, including discussions on the labor market. Data from the Federal Reserve Economic Data (FRED) was used to conduct naive linear regressions, supporting the hypothesis that uncertainty affects the cost of skilled labor. Both directions of impact exist, and each variable individually impacts the cost of skilled labor.

### **Effects of Changing Temperature on Arabidopsis Mutants**

*Presenter(s): Eric Macro, Andrea Nyguen, and Sebastian Wong*

*Faculty Mentor(s): Bill Martin*

*Session Time: 11 to noon*

*Poster #72*

This project explored how *Arabidopsis thaliana* reacts when one of its genes is interrupted. The unPAK network (research collaborative studying T-DNA insertion mutations) supplied seed of 10 landraces, the original Columbia accession (Col-0), and 10 single-insertion T-DNA lines created from Col-0. The 11 accessions were grown in a randomized complete block design in 12 trays that contain 32 plants each, 384 plants in total. Half of the trays were grown at 20 degrees C and the others were at 24 degrees C. *Arabidopsis* is a cool-loving plant that may struggle with increasing global temperatures. This research utilized its normal environmental condition, 20 degrees, and that of a warmer world at 24 degrees C. The rosette diameter of each plant was measured when the plant flowered. Plants grown at 24 degrees C had a significantly larger diameter than those grown under 20 degrees C. In addition, significant differences were found between the genetic lines. *Arabidopsis* grows and flowers more

quickly at a warmer temperature. As the climate warms worldwide, knowledge of how these mutants respond to temperature may impact research into crop growth.

### **Vanadium as a Tracer in Oxide Copper Gold (IOCG) Deposits**

*Presenter(s): Akemi McHan*

*Faculty Mentor(s): Mark Frank*

*Session Time: 1 to 2p.m.*

*Poster #99*

*Research Rookie*

Society's shift towards clean energy sources requires metals needed for solar and wind power be extracted from the earth. Iron Oxide-Copper-Gold (IOCG) deposits hold many of the required metals, however, the formation of IOCGs is not well understood. Vanadium (V) can substitute into iron oxide minerals and has been used by some researchers as an indicator of the deposit's genesis. Recent work, however, has questioned V's usefulness. Authors hypothesized that varying pH and temperature in an iron oxide-fluid system would result in V exchange between the minerals and fluid, therefore negating its effectiveness as a genesis indicator. Iron oxide minerals and fluids of varying HCl concentrations were equilibrated at 150, 200, and 250 °C to test the hypothesis. V was measured in the fluid and minerals before and after each experiment to document V's mobility and therefore its effectiveness as a tracer in the formation of IOCG deposits.

### **Expression of Genes from Pseudomonas 20ei1 Bacteria for Production of Antibiotics and Other Compounds of Medical Importance**

*Presenter(s): Rosy Mejia, Ayesha Khan, and Brianna Glee*

*Faculty Mentor(s): Scott Grayburn*

*Session Time: 1 to 2p.m.*

*Poster #73*

*Student Engagement Fund*

Antibiotic resistance is a major problem for human health. Understanding the genetic makeup and gene expression patterns of Pseudomonas 20ei1 bacteria can help to discover novel genes that may have medical significance. This project identified genes associated with antibiotics and other inhibitors, investigating growth conditions that might enhance production of useful products. Bacteria were grown in six different conditions and RNA was isolated. Quantitative real-time polymerase chain reactions (qPCRs) were used to measure the expression of different genes. Bioinformatics analysis identified genes with possible medical importance including antibiotic-specific proteins, MacA and tobZ. Genes involved in biofilm formation, toxin production, and pathogenesis were also studied. The maximum expression levels of different genes varied based on growth conditions. Understanding bacterial genes of Pseudomonas 20ei1 at the molecular level can strengthen strategies to tackle antibiotic resistance and safeguard human well-being.

## **Exploring the Moderating Effect of Perceived Situational Typicality on Conscientiousness and Counterproductive Work Behaviors (CWBs)**

*Presenter(s): Kyle McNeel*

*Faculty Mentor(s): Rachel Saef*

*Session Time: 9 to 10a.m.*

*Poster #8*

Counterproductive work behavior (CWB)—harmful behavior to the organization and those in it—remains an issue for organizations. Research recommends hiring conscientious employees, as they are generally less likely to engage in CWBs (Berry et al., 2007). However, we argue conscientiousness is not always entirely beneficial. Drawing from the CAPTION framework of situation perception (Parrigon et al., 2017) and cognitive-affective processing (CAPS) theory, we hypothesized that the influence of conscientiousness on CWBs will be weaker in atypical (i.e., unpredictable, unusual) situations. Specifically, due to incompatibility between atypical situations and conscientious people's proclivity for order and structure, atypicality will weaken the negative conscientiousness-CWB relationship. Participants self-reported conscientiousness, as well as situational typicality (2x/day) and daily CWBs (end-of-day), for 2 business weeks. Multilevel regression showed that conscientiousness (person-level) negatively predicted daily-level of CWB, but that, while in the expected direction, changes in situational atypicality did not significantly moderate this relationship.

## **High Throughput Cultivation of Freshwater Microorganisms in the Kishwaukee River**

*Presenter(s): Daisy Mendez*

*Faculty Mentor(s): Michael Henson*

*Session Time: 1 to 2p.m.*

*Poster #68*

*Research Rookie*

Aquatic ecosystems encounter numerous challenges, significantly impacting their overall ecosystem health. Microorganisms are the "first responders" to disturbances and imbalances. Yet, microorganisms remain difficult to culture using traditional techniques, complicating studies into their role in ecosystem health. Here, we sought to better understand the microorganisms in the Kishwaukee River using high-throughput cultivation. We developed an artificial freshwater medium (AFM) to help facilitate their isolation. Next, water was inoculated into 96 well plates containing our AFM at 2 cell(s)/well. After incubation, cells were counted using a flow cytometer to detect positive wells. In total, 184 wells were inoculated resulting in 25 positive wells and a 7.3% cultivability, well above the 0.1% for traditional approaches. Preliminary findings demonstrate that HTC and the AFM effectively cultivate microorganisms. Future work will identify the isolates and continue to study how microbes respond to changes over time and space.

### **GPCR Screen Research**

*Presenter(s): Paige Minogue and Margaret Myer*

*Faculty Mentor(s): Olivier Devergne*

*Session Time: 9 to 10a.m. Poster #78*

Epithelial cells are an abundant cell type of the body, making up tissues that form many organs. They serve as protective layers, mediate secretion, and regulate nutrient uptake. Epithelial cells have a unique architecture that is important for these functions. One aspect of this architecture is the proper placement of the basement membrane (BM). Misplacement of this structure can lead to pathologies such as cancer. Our lab focuses on genes involved in the proper placement of the BM. Specifically, this project explores the relationship between G-protein coupled receptors (GPCRs) signaling and the BM. To do so, the follicular epithelium (FE) of the *Drosophila Melanogaster* ovaries were used as the model system. The FE is a classical epithelium that secretes all the main components of the BM. To identify the GPCRs important for the proper deposition of the BM, we performed a genetic screen using RNAi lines that led to a decrease in the expression of different GPCRs. This makes possible the identification of specific GPCRs important for BM deposition, a process critical for epithelial architecture, which could lead to understanding various human pathologies.

### **Thais in Illinois Oral History Project: Living Archaeology, Artifacts, and Implications**

*Presenter(s): Alia Moran*

*Faculty Mentor(s): Kanjana Thepboriruk*

*Session Time: 1 to 2p.m. Poster #84*

*McKearn Fellowship*

This project is part of the Thais in Illinois Oral History Project, funded by the Henry Luce Foundation, which trains Thai American teens to collect oral histories and cultural ephemera from community members in the Chicagoland area. The collection sites include Thai religious institutions and social organizations, with the goal of filling the knowledge gap on Thai Americans. This project utilizes the lenses of archaeology, ethnography, and history to explore the concept of "living archaeology" as it relates to the development of Thai American history as a case study. The author seeks to understand if and how archeological concepts can be used to interpret the active material culture, rather than artifacts, and to explain intergenerational cultural and linguistic attrition in the Thai diaspora. The project further explores the role of participation in Thai communities for retaining cultural and linguistic skills and practices and the selection of field sites for creating this real-time archive.

### **Exploring Alopecia Medications**

*Presenter(s): Leslie Munoz*

*Faculty Mentor(s): Timothy Hagen*

*Session Time: 9 to 10a.m. Poster #54*

*Research Rookies*



This research project focused on the identification of new drug-like molecules to treat hair loss (alopecia). Finasteride is a prescription drug that is used to treat pattern hair loss in men. Finasteride works by inhibiting the enzyme human steroid 5 $\alpha$ -reductase 2 (SRD5 $\alpha$ 2). In a search for new compounds, molecular docking of 730,000 compounds present in the ZINC database was conducted. The docking experiments were done using the Schrodinger molecular docking program. The docking experiments identified 120 compounds that were predicted to potentially inhibit the SRD5 $\alpha$ 2 enzyme. The docking studies revealed diverse interactions mainly through hydrogen bonding between the SRD5 $\alpha$ 2 protein and the ligands. The key amino acid residues from the SRD5 $\alpha$ 2 enzyme involved in ligand binding were Arg 114 and Glu 57. These findings suggest that the hits identified through the docking could be potent inhibitors of the SRD5 $\alpha$ 2 enzyme, offering further insight into the development of new alopecia treatments.

### **Are You Even Sorry? Apologizers' and Recipients' Perceptions of Withheld Apologies**

*Presenter(s): Ingrid Murillo*

*Faculty Mentor(s): Randy McCarthy*

*Session Time: 2 to 3p.m.*

*Poster #9*

*Research Rookie*

Apologies often serve as ways to make amends after a transgression. The current study looked at judgments of withheld apologies from the perspective of the apologizer and the recipient. Participants either recalled a time they committed a transgression they had not given an apology or a time another person committed a transgression and had not received an apology. When thinking about a time they had withheld an apology from somebody else, participants agreed significantly less that their apology was withheld because they did "not feel remorse," and because they were "withholding the apology to be hurtful." In contrast, when thinking about a time they withheld an apology from somebody else, participants more strongly agreed that they were "waiting for the right time to apologize." This study showed that potential apology recipients were concerned about the sincerity of the apology.

### **Radiation Riddles: Cracking the Code of Brain Fog**

*Presenter(s): Ingrid Murillo and Baraa Thannoon*

*Faculty Mentor(s): Doug Wallace*

*Session Time: 1 to 2p.m.*

*Poster #6*

Radiation-induced brain fog is a cognitive deficit that is a challenging consequence of therapeutic radiation exposure in humans. Radiation exposure can cause widespread disruptions in cellular function resulting in impaired communication among networks of neurons. This experiment used the organization of open-field behavior to characterize cognitive deficits associated with mice exposed to a therapeutic dose of radiation. The experiment was conducted on ten control mice and six mice with radiation dosage. The mice were tested on the open field prior to radiation exposure and two and four months after exposure. The footage was examined using motion tracking software to analyze

towards and away progressions from home base. The experiment showed no significant results, however, with an improved holding apparatus this might be able to isolate radiation to the brain and help further research.

### **BARKS 2023**

*Presenter(s): Em Myers and Jonathan Durbin*

*Faculty Mentor(s): Colin Kuehl*

*Session Time: 10 to 11a.m.*

*Poster #90*

*Student Engagement Fund*

The research aimed to understand the environmental attitudes and knowledge within the NIU community through descriptive statistical analysis. Data was collected through an online survey which received 1572 responses and 978 of which were used in the analysis. The largest demographic crosstab was white females as with most survey research. The key findings include general environmental concern, low environmental knowledge scores, and the NIU community holding primary concern for waste management at NIU. The plan is for this survey to be replicated in 2027. Environmental behaviors were gauged as well, allowing researchers and practitioners to better account and predict student actions. Additionally, information collected by the survey will be used by NIU administration to guide further environmental policies.

### **Analysis of the Structure of LiTFSI Electrolytes for Lithium-Ion Batteries**

*Presenter(s): Emanuel Naumann*

*Faculty Mentor(s): Tao Li*

*Session Time: 9 to 10a.m.*

*Poster #56*

*McKearn Fellowship*

A significant source of energy storage is seen through using lithium-ion batteries, which are constructed in a large range of sizes to power various technologies. However, the current standard of organic electrolyte, lithium hexafluorophosphate (LiPF<sub>6</sub>), features critical shortcomings in thermal stability that hinder its safety and efficiency. To combat these issues, alternative aqueous electrolytes are being tested. The factors of (high) energy density, (high) ionic conductivity, and (low) viscosity affect an electrolyte solution's overall usability, and analyzing their structures provides insightful information as to why some are more optimal than others. Using a combination of Raman and infrared (IR) spectroscopies, the structures of lithium-bis (trifluoromethane sulfonyl) imide (LiTFSI) were compared in different solvent mixtures, including 100% water, 100% methanol, and a volumetric ratio of 50% water and 50% methanol. In addition, each of these solvent combinations was also measured in four different solute concentrations, including 1m, 5m, 10m, and 20m.

## **The Role of the *hdt5* Gene in *Aspergillus flavus* Morphology and Mycotoxin Production**

*Presenter(s): Marianna Neau*

*Faculty Mentor(s): Ana Calvo*

*Session Time: 11 to noon*

*Poster #58*

*Honors Capstone*

*Aspergillus flavus* is a ubiquitous fungal pathogenic species. It colonizes various oil-seed crops such as peanuts and corn and is also an opportunistic human pathogen (Bio, 2023). When infecting plant crops this fungus produces aflatoxins, potent carcinogenic compounds which have a serious health impact and cause significant economic losses in the agricultural sector globally. Characterization of the *A. flavus* genome is therefore important for the development of novel strategies against *A. flavus*. *hdt5* is an unstudied transcription factor gene dependent on the homeobox transcription factor 1 (*hbx1*) gene of *A. flavus*. We hypothesize that this gene could have roles in fungal development, overwintering, and aflatoxin production in this fungus. To test this hypothesis, we have generated a deletion mutant of this gene and a complementation control strain. We are currently examining colony morphology and mycotoxin production in the wild-type, *hdt5* deletion, and complementation strains.

## **Stronger Storytelling with Museums and Theatre**

*Presenter(s): Elizabeth Nowak*

*Faculty Mentor(s): Jessica Cima and Gibson Cima*

*Session Time: 2 to 3p.m.*

*Poster #87*

*Research Rookie*

Museums and theatres tell stories, but through different means. Museums use objects, while theatrical performances use actors. There are comparatively few examples of museum exhibits appearing in theatre lobbies and those that exist are not curated by museum professionals. This led to the question, "How do museum objects in the lobby of a theatrical production affect the audience's experience?" The exhibit "Double Standards of Witchcraft Accusations" was designed to help find an answer. The researcher curated this exhibit while serving as the dramaturg for NIU's production of "Witch" by Jen Silverman. Audience members were encouraged to complete a survey to evaluate their experience and understanding of the play after viewing the exhibit. The survey findings helped verify that museum objects do have a positive impact on the audience's experience. This combination of historical elements and creative performance can give the audience a more well-rounded and enriching experience.

## **NIU 2023 Greenhouse Gas Inventory Report**

*Presenter(s): Sophie Orozco and Sammy Gonzalez*

*Faculty Mentor(s): Melissa Burlingame*

*Session Time: 9 to 10a.m.*

*Poster #93*

Northern Illinois University (NIU) is conducting a Greenhouse Gas (GHG) Inventory for the 2023 calendar year which aims to measure university emissions. Internal/institutional

and external/non-NIU data are being collected under three different measurement categories (scopes) outlined by the Sustainability Indicator Management and Analysis Platform (SIMAP). Scope 1 emissions are direct GHG emissions from sources controlled or owned by NIU. Scope 2 are indirect GHG emissions associated with the purchase of electricity, steam, heating, or cooling. Scope 3 emissions are from activities related to NIU that are not owned or controlled by NIU. Data is input into SIMAP and used to compare 2023 emissions to previous 2019 and 2020 emissions data. We expect GHG emissions to have increased from 2020, partly due to the COVID-19 pandemic and return to in-person operations. The final findings of the GHG Inventory will help guide the implementation of the Sustainability and Climate Action Plan signed in November 2023.

### **Enhancing the teaching of Computer Architecture and System Organization through a Minigame-based Intelligent Tutoring System**

*Presenter(s): Minhaz Suleman Ibrahim Patel*

*Faculty Mentor(s): Reva Freedman*

*Session Time: 11 to noon                      Poster #150*

*Honors Capstone*

The research addresses the growing popularity of gaming among young people, identifying it as an opportunity to revolutionize traditional educational methods. It proposes the integration of game-based learning into an Intelligent Tutoring System (ITS) to teach educational topics. This approach is designed to overcome the limitations of traditional education, which often relies upon memorization and passive absorption, by offering a more interactive and engaging learning experience. The research seeks to improve engagement, comprehension, and retention by incorporating complex concepts into minigames, enabling personalized learning and instant feedback. Focused on computer architecture and system organization, the research involved designing and developing a set of four distinct minigames, each targeting a different topic within the subject matter. The effectiveness of this approach will be assessed by introducing ITS to the course's students. This evaluation will specifically measure the ITS's influence on student engagement, learning outcomes, and overall satisfaction with the educational experience.

### **Individual Tendencies Towards Thematic and Taxonomic Processing Through Holistic and Analytical Thinking**

*Presenter(s): Arathi Patri*

*Faculty Mentor(s): Katja Wiemer*

*Session Time: 2 to 3p.m.                      Poster #34*

Thematic and taxonomic processing systems are the two parts of semantic memory. Thematic processing considers concepts based on their complementary relationships within a given situation. Taxonomic processing considers concepts based on their categorical relationships. This study is interested in individual tendencies towards thematic and taxonomic processing. To test this, participants were tasked with a Rod (line) and Frame (square) test which measures individual tendency towards analytic or

holistic cognition style. To measure individual tendency towards thematic or taxonomic processing, participants were presented with a series of words in groups of three, called triads, containing a target-word, a thematic response-word, and a taxonomic response-word. They had to choose the best matching response-word for the target-word. It is hypothesized that those who score higher as holistic will be more likely to engage in thematic processing, and those who score higher as analytic are more likely to engage in taxonomic processing.

### **Parent-Adolescent Conflict about Peers and its Relation to Adolescent Anxiety, Separation Anxiety, Generalized Anxiety Disorder, and Social Phobia**

*Presenter(s): Autumn Pierce and Joanna Diaz*

*Faculty Mentor(s): Nina Mounts*

*Session Time: 9 to 10a.m.*

*Poster #26*

Parental conflict about peers rises as adolescents spend more time with peers and as they develop autonomy (Bray et al., 2022). Previous research suggests that higher levels of parent-adolescent conflict was related to poorer self-esteem (Wu et al., 2023) and increases in alcohol usage over time. In this investigation, parent-adolescent conflict about peers was examined using the following questions. First, are there gender differences in the major variables? Second, is age related to the major variables? Third, is parental conflict about peers related to self-esteem, physical victimization, or relational victimization? Finally, are these relationships moderated by child gender? Participants were 64 mother-adolescent dyads. Adolescents completed the Parent-Child Conflict about Peers measure (Mounts, 2007) and the Spence Children's Anxiety Scale (Spence, 1997). Using t-tests, no significant differences were found between boys and girls for the major variables. Correlational analyses suggested that older age was related to higher parental-adolescent conflict about peers, total anxiety, and other issues. PROCESS Model 1 (Hayes, 2018) was used to examine the moderating effect of gender, covarying for age. For boys, higher levels of parent-adolescent conflict about peers was associated with higher separation anxiety and social phobia.

### **Climate Change Denial Intervention**

*Presenter(s): Brian Podkulski and Alfonso Moraga*

*Faculty Mentor(s): David Valentiner*

*Session Time: 2 to 3p.m.*

*Poster #28*

*Honors Capstone*

Climate change is a polarizing issue, with some recognizing its severity and others denying its existence despite the evidence. This study intended to test the effectiveness of an intervention inspired by Sparks and associates' work on self-affirmation and pro-environmental actions (2010), while using Prochaska and associates' Stages of Change Model (1992) to measure participants' deniability. Participants answered questions on either their highest-ranked or lowest-ranked value. After watching a video about climate change denial, participants answered five open-ended questions. The responses were assigned to the stage that was most relevant to it. It is hypothesized that the experimental group would be further along in the Change Model than the control group.

Data was analyzed via t-test, focusing on narrative scoring and self-report measures. This study provides a way to assess an individual's willingness to act against climate change and tests the impact of a novel intervention on climate change denial.

### **Evaluation of Fingerprint Detection Techniques**

*Presenter(s): Makayla Pryor*

*Faculty Mentor(s): Oliver Hofstetter*

*Session Time: 2 to 3p.m.*

*Poster #55*

*Student Engagement Fund*

The detection and identification of fingerprints continues to be significant in criminal investigation and prosecution. The Hofstetter group at NIU has recently created novel lifting devices that allow instantaneous visualization of fingerprints under ambient or luminescent conditions. Detection is based on the reaction of acidic components contained in fingerprint secretions with pH indicators that have been immobilized onto membranes. To understand under which conditions the membrane lifters yield good fingerprint ridge detail, they were tested on a variety of substrates such as glass, plastic, and aluminum foil with varying pressure. The influence of the composition of fingerprint deposits was evaluated by investigating the three main types of fingerprints: charged marks, eccrine marks, and natural marks. Results obtained with the novel membrane lifters were compared to the visualization capability of fingerprint powder. Preliminary results indicate that the lifters can provide excellent ridge detail with both charged and natural marks, however, eccrine marks consistently yield less detail, when compared to powder dusting.

### **Assessing Health of Football Players over Time through Data Learning**

*Presenter(s): Jarius Ransom*

*Faculty Mentor(s): David Koop*

*Session Time: 1 to 2p.m.*

*Poster #152*

*Research Rookie*

The study uses data analysis to assess how changes in the rules and types of turf affect injuries among NFL football players. The project aims to have a better understanding of player safety, including patterns of injuries for certain positions. Therefore, more strides can be made towards making the sport safer. Coding scripts from the Python language were created to extract injury data from websites and then used to examine the connections between player positions, season, field and injury type. What's found in the scripts will get cross-examined with other findings at the collegiate level. All the data points regarding the increase in synthetic fields and rule changes point to creating an increase in lower body injuries.

### **The Resiliency Quotient**

*Presenter(s): Anahied Rayzian and Britne Newsome*

*Faculty Mentor(s): Bill Martin*

*Session Time: 1 to 2p.m.*

*Poster #64*



Students can miss out on competitive careers stemming from degrees in science, technology, engineering or mathematics because they fail to make it through the introductory curriculum that acts as a gateway into these STEM careers. This study aims to understand why students abandon introductory coursework by surveying students completing BIOS 208, an introductory course in Biological Sciences, during the spring 2024 semester. Moving beyond looking at ACT performance to gauge preparedness, the study considers other factors. Some of the considerations are whether the course material is connected to career outcomes, provides meaningful links to students' variable experiences, and student self-directedness.

### **Synthesis of Pyrazole Derivatives using Knorr Pyrazole Reaction**

*Presenter(s): Haidar Raza*

*Faculty Mentor(s): Timothy Hagen*

*Session Time: 11 to noon                      Poster #51*

The pyrazole ring is present in many biologically active drugs and is known as a privileged structure in medicinal chemistry. In this study, we embarked on synthesizing various 5-hydroxy pyrazole derivatives using the Knorr pyrazole reaction. In a Knorr pyrazole reaction, pyrazoles are formed by combining a hydrazine and 1,3-dicarbonyl compound using an acid as a catalyst. After completing each reaction, all the synthesized compounds were purified by normal phase column chromatography. Subsequently, all purified products were confirmed by various analytical techniques. Nuclear magnetic resonance (NMR) and mass spectrometry were utilized to characterize the structure of the products. High performance liquid chromatography was used to test for purity.

### **Elucidating the Function of the *osaA* Gene in *Aspergillus flavus* Morphology and Conidiation**

*Presenter(s): Makayla Ritko*

*Faculty Mentor(s): Ana Calvo*

*Session Time: 2 to 3p.m.                      Poster #42*  
*Research Rookie*

*Aspergillus flavus* is an opportunistic fungal pathogen that produces carcinogenic aflatoxins and colonizes economically important crops. *A. flavus* can also cause respiratory aspergillosis in immunocompromised humans with a high mortality rate. OsaA, an orchestrator of sexual and asexual development was known to regulate development, secondary metabolism, and virulence in human pathogen, *Aspergillus fumigatus*. We hypothesized *osaA* to play a similar role in regulating several regulatory pathways in *A. flavus*. Our morphological analysis indicated a reduction in colony diameter of the *osaA* deletion mutant with respect to the control strain. Furthermore, deletion of *osaA* resulted in a reduction in sclerotial maturation and conidial production rate as compared to *A. flavus* wild type, suggesting an important role in *A. flavus* development and sporulation. *A. flavus osaA* thus shows promising potential as a target for gene therapy to diminish the harmful effects of *A. flavus* on agriculture.

### **Through the Darkness: Tracking Spatial Memory in Alzheimer via Dark Exploration using 5xFAD Mice Models**

*Presenter(s): Lila Roblin*

*Faculty Mentor(s): Doug Wallace*

*Session Time: 10 to 11a.m.*

*Poster #12*

*Research Rookie*

Alzheimer's disease presents with various motor & cognitive deficits, which can stem from an accumulation of amyloid plaques and tangles in the cortex and hippocampal area. It is common to see an onset of "wandering" type behavior during the mid to late stages, which can be extremely dangerous for an individual. This study investigated changes in spatial orientation in the 5xFAD mouse model of Alzheimer at three and six months. Movement of mice was recorded when placed on a round table under dark conditions with a tactile cue attached to the edge of the table. The resulting data was analyzed using a video tracking system for various spatial navigation measures such as total distance traveled, home base stability, and path circuitry. Whether or not there will be significant differences between the groups, the data will help further understanding of impaired behaviors in humans suffering from this disease.

### **The Effects of Female Estrous Cycle on PCA Index**

*Presenter(s): Lana Samuel*

*Faculty Mentor(s): Leslie Matuszewich*

*Session Time: 10 to 11a.m.*

*Poster #5*

*Honors Capstone*

Hormonal changes experienced during menstrual cycles can have significant effects on a female's behavior, food and fluid intake, stress levels, motivation, memory, and social interactions. The research aims to explore the impact of hormonal fluctuations on the drive for sugar rewards to better understand the reported craving for sugar by women. In this study, rodents were used gain a better understanding of the impact of hormonal fluctuations on reward processes with respect to highly palatable sugar rewards. The estrous cycle of female rats has similar fluctuations in the gonadal hormones, estrogen, and progesterone, as the menstrual cycle in humans. Pavlovian Conditional Approach (PCA) was used across the different hormonal states of the female rat. We hypothesize that female rats exhibit a change in motivation for sugar, reflected in their lever-press during different stages of the estrous cycle.

### **Keeping it Clean: Monitoring Chloride Levels in Waterways - NIU Edition**

*Presenter(s): Christopher Salgado, Kaizon Cummins, and Adrian Jones*

*Faculty Mentor(s): Bill Martin*

*Session Time: 9 to 10a.m.*

*Poster #52*

Chloride contamination in water bodies presents environmental challenges. High chloride levels exert adverse effects on aquatic ecosystems and pose potential risks to human infrastructure. Chloride levels in samples of surface water were observed every other week from two distinct locations on the NIU campus. The East Lagoon is

characterized by comparatively stagnant water while the South Branch of the Kishwaukee River is a free-flowing water system. This citizen science, water-quality monitoring project was part of the Winter Chloride Watchers program as part of the Illinois River Watch and the International Water Rangers.

### **The Effects of Various Dairy Farms Foods on the Longevity of Adult House Flies (*Musca domestica*)**

*Presenter(s): Anahita Senobari*

*Faculty Mentor(s): Bethia King*

*Session Time: 1 to 2p.m.*

*Poster #59*

*Research Rookies*

House flies (*Musca domestica*) are cosmopolitan pests that spread diseases to humans and livestock. Previous studies rarely include foods available to house flies in their natural habitat. This study examined how different dairy farm foods affect the lifespan of adult house flies. Male and female flies were given one of six foods: sucrose, whole milk, corn silage, cattle manure, common buckwheat flowers, or water. Survivorship was measured for 22 days. Males and females lived longer when given sucrose, buckwheat, or milk compared to water. Longevity on both buckwheat and milk was lower than sucrose. Female flies also lived longer on silage than water. Longevity on silage was lower than sucrose. There was no significant difference in longevity on silage (in males) or manure (both sexes) compared to water. Studying a wider variety of foods and their nutritional contents can provide more information on what house flies need to live longer.

### **Exploring the Dynamics of Code-Switching Among Mexican-Americans: Motivations, Linguistic Realization and Communicative Goals**

*Presenter(s): Fatima Serrato*

*Faculty Mentor(s): Giovanni Bennardo*

*Session Time: 11 to noon*

*Poster #82*

*Research Rookies*

Code-switching is defined as mixing languages without changing their content (Poplack, 2001). Seeking to understand how Mexican-Americans use code-switching practices, this study explored the extent to which code-switching occurs within the Mexican-American community, its characteristics, and the reasons for its use. Using recordings from participants and past research projects from NIU's Latino Studies department, the code-switching of Mexican-American individuals is monitored. Three key questions are explored regarding code-switching among Mexican-Americans: 1) Why do Mexican-Americans engage in code-switching? 2) At which level of linguistic production is this practice typically realized? and 3) What goals do speakers aim to achieve in their daily communicative engagements through code-switching? By considering these nested questions, conversational code-switching is acknowledged, and by observing code-switching, gaps in understanding why such swapping occurs in Mexican-American communities can be explored more thoroughly.

### **Growing Green: The Positive Impact of Trees in Lake County**

*Presenter(s): Michael Schiltz, Ellie Mullins, Ngun Par, and Amara Thompkins*

*Faculty Mentor(s): Melissa Burlingame*

*Session Time: 11 to noon*

*Poster #92*

*Senior Design Project*

Lake County's Tree Initiative is designed to increase tree canopy coverage and address stormwater management in collaboration with local government entities. Through this tree initiative, county officials seek to create a culture that embraces the benefits of urban forestry by raising awareness of urban forest challenges and promoting habitat protection and climate resilience. As students in NIU's ENVS 491 class, we collaborated with Lake County to create a community outreach toolkit that provides the educational materials and details the steps necessary to instigate this cultural change. Additionally, we identified questions each community could use to measure the cultural shift that respects the role urban forestry plays to combat nutrient pollution, mitigate stormwater runoff, and enhance well-being.

### **Bullying Participant Role Behaviors and School and Life Satisfaction**

*Presenter(s): Jenna Shattuck and Leslie Ocampo and Nick Tanasa, Andrew Krause, and Amanda Heringa*

*Faculty Mentor(s): Michelle Demaray and Christine Malecki*

*Session Time: 1 to 2p.m. and 2 to 3p.m.*

*Poster #36*

Bullying is a serious problem with hurtful consequences for the mental and physical well-being of adolescents (Waseem & Nickerson, 2023). Less is known about how different bullying role behaviors may be associated with life or school satisfaction (Rezapour & Khanjani, 2019). There are five bully role behaviors: (a) bullying, (b) victimization, (c) assisting in bullying, (d) defending the victim, and (e) outsider behavior (ignoring bullying). Life and school satisfaction are one's assessments of quality of life or school experience. The goal of the current study was to understand how the five bullying role behaviors are associated with school and life satisfaction. Participants in this study were 1,092 students from a midwestern middle school who completed a series of surveys online on bullying participant behavior, life, and school satisfaction. Significant associations were found, with interesting patterns discovered between more positive and negative bully role behaviors with life and school satisfaction.

### **Antimicrobial Resistance in *Arcobacter*: An Emerging Pathogen of Animals and Humans**

*Presenter(s): Samantha Smith and Morgan Burns*

*Faculty Mentor(s): Pallavi Singh, Melissa Lenczewski, Tomoyuki Shibata*

*Session Time: 10 to 11a.m.*

*Poster #60*

Antimicrobial resistance (AMR) has become a major threat to human health in recent years. *Arcobacter* is an emerging contaminant that has been exhibiting AMR since 2012 and is transmitted through contaminated food and water. *Arcobacter* infects both humans and animals causing heart conditions, gastroenteritis, etc. Membrane filtration

is used for its isolation followed by molecular detection of AMR genes. This study performed an in-depth literature review of *Arcobacter* to compile its epidemiological status. This in-depth review shows that *Arcobacter* has developed resistance to several antibiotics, like ciprofloxacin and danofloxacin. Creating new antibiotics is the unlikely solution to AMR, but other research pathways exist such as researching alternative drug therapies and infection prevention. Therefore, pursuing other methods for treating *Arcobacter*, such as bacteriophage therapy, may be essential. As the microbes evolve at an unprecedented rate, alternative solutions to resistant infections are necessary because human and animal lives are on the line.

### **Suck it Up - Carbon Sequestration on NIU Campus**

*Presenter(s): Samantha Smith, Lea Guelde, Angel Pintor*

*Faculty Mentor(s): Bill Martin*

*Session Time: 2 to 3p.m.*

*Poster #95*

Carbon sequestration (CS) is a natural process of the carbon cycle that takes CO<sub>2</sub> out of the atmosphere and stores it in plants and soil. CS is especially important today because CO<sub>2</sub> and other greenhouse gases are being released into the atmosphere from human activities at an unprecedented rate. Every plant on the Northern Illinois University (NIU) campus participates in CS. Our study will establish and compare baseline CS data by quantifying aboveground biomass in different landscapes on the NIU campus. Samples or measurements from replicated samples within each landscape type were taken to determine aboveground biomass and calculate CS. Expected results are to find the most CS in forested areas and the least CS in turf grass. Implications include advocating for changes in the landscape types in the built environment to impact CS on the NIU campus.

### **Voluntary Staff Turnover**

*Presenter(s): Erica Stevia Inkale*

*Faculty Mentor(s): Mark Schuller*

*Session Time: 1 to 2p.m.*

*Poster #40*

Increases in voluntary staff turnover in the nonprofit sector cause significant challenges in the sector, including for the communities served by these organizations. Employing a survey of nonprofit directors and human resources professionals and interviewing former and current NGO staff from the Rockford IL area, the project aims to understand the factors causing staff turnover in the nonprofit sector. Solutions to stemming the outflow of nonprofit workers will be suggested based on which factors (e.g., workload, growth opportunities, wages) are found to be responsible for the issue.

### **Synthesis of Substituted Biaryl Benzoic Acids Using Microwave Suzuki Reactions**

*Presenter(s): Allison Stewart*

*Faculty Mentor(s): Timothy Hagen*

*Session Time: 10 to 11a.m.*

*Poster #53*

This research focuses on the synthesis and importance of biaryl benzoic acids, emphasizing the effectiveness of palladium-catalyzed Suzuki cross coupling reactions. Suzuki reactions offer a robust method for synthesizing biaryl benzoic acids from aryl halides and aryl boronic acids. Due to their versatile properties, biaryl benzoic acids hold substantial significance across diverse domains such as materials, catalysis, dyes, pharmaceuticals, and natural product synthesis. This research contributes to the advancement of synthetic methodologies for accessing these valuable compounds.

### **Fixed or Flexible: Do Closely Related Lemur Species Diverge in their Nutritional Niche?**

*Presenter(s): Bellamy Taylor*

*Faculty Mentor(s): Michelle Irwin*

*Session Time: 2 to 3p.m.*

*Poster #100*

Knowledge of feeding habits of individual primate species exists, but relatively few comparative, multi-species studies have been conducted. This gap in knowledge leaves it unclear if closely related species rely on nutritionally similar foods, or if they have diverged to adapt to differing environments. Understanding dietary overlap in primates can aid in habitat management by identifying plant species of importance. This project sought to examine the degree of similarity between the diets of two closely related lemur species in Madagascar: the Milne-Edwards sifaka (*P. edwardsi*) and the Diademed sifaka (*P. diadema*). The Irwin lab was used to measure nutrient content in samples of the top foods of *P. edwardsi*, and this data was then compared to pre-existing data for *P. diadema*. The nutritional composition of the foods is similar for the two species, suggesting a common nutritional strategy despite having different foods available.

### **Biomarkers of Brain Fog: Analysis of $\gamma$ H2AX**

*Presenter(s): Dominic Teoli*

*Faculty Mentor(s): Linda Yasui*

*Session Time: 1 to 2p.m.*

*Poster #48*

In radiation therapy to treat brain cancer, it is common for patients to experience brain fog. Radiation-induced brain fog describes the symptoms of cognitive disabilities due to inflammation resulting from cellular collateral damage from radiation therapy. The neuroinflammatory response includes various amounts of mechanisms, however, this research focuses on the  $\gamma$ H2AX histone which aids in the repair of DNA double-strand breaks. It is hypothesized that large amounts of  $\gamma$ H2AX in brain tissue can be a useful biomarker for identifying brain fog. To analyze the  $\gamma$ H2AX foci, previously collected image data of mice brains were analyzed using the Zeiss confocal image analysis software. 3D rendering and quantification of foci on these images was implemented with the help of machine learning from the image analysis software Imaris.

## **A Peripatetic Penis: The Commoditization of Culture in Southeast Asia**

*Presenter(s): Violet Thorp*

*Faculty Mentor(s): Trude Jacobsen Gidaszewski*

*Session Time: 1 to 2p.m.*

*Poster #86*

Commodification of artifacts that once held great cultural symbolism is rampant throughout Southeast Asia. One specific handicraft that gained popularity among tourists are phallic charms and amulets. Recently, the NIU Center for Southeast Asian Studies came into possession of a Southeast Asian phallic charm found in Florida in the 1970s. Is it ethical to commodify cultural significant objects and how does the perception of Southeast Asia get distorted through commodification? This research consisted of looking at other commodified phallic charms, reading scholarship on commodification, and visiting local collections of Southeast Asian artifacts. The commodification of spiritual objects leads to the eroticization of Southeast Asian cultures along with destroying the spiritual meaning behind these objects. The handicrafts become mere items for sale and they lose their intrinsic cultural meaning over time. This research will help Americans understand their perception of Southeast Asian culture as well as the impacts of the continued commodification of spiritual objects for profit

## **Dietary Differences between Male and Female Deer Mice (*Peromyscus maniculatus*) in Tall-Grass Prairie Ecosystems with Varying Land Management techniques.**

*Presenter(s): Allyson Thompson*

*Faculty Mentor(s): Holly Jones*

*Session Time: 1 to 2p.m.*

*Poster #44*

*Honors Capstone and Student Engagement Fund*

Tallgrass prairies are some of the most threatened ecosystems. Less than 1% of Illinois is still tallgrass prairie. Prairie ecosystems are incredibly complex. Human interactions with land management have significantly altered tallgrass prairies. Of those management techniques, prescribed fire and the reintroduction of grazing ungulates have changed the composition of these ecosystems. Small mammal populations within tallgrass prairie ecosystems are essential components of prairie biodiversity. Small mammals play a crucial role in food webs within tallgrass systems and can be used to assess the health and functionality of the site. This study uses small mammal hair samples and stable isotope analysis to study the dietary niche variations between male and female deer mice, comparing male and female nutritional preferences, as well as examining the impacts of prescribed fire and bison reintroduction. This work will support a greater understanding of land management's impacts on tallgrass prairie communities.



## **Assessing the Relationship between Autistic-like Traits in Adults and their Descriptions of Concrete and Abstract Concepts**

*Presenter(s): Henry Tomiser*

*Faculty Mentor(s): Katja Wiemer and Allison Gladfelter*

*Session Time: 1 to 2p.m.*

*Poster #30*

*Honors Capstone*

Concrete concepts (e.g., BUTTON) can be experienced directly by the senses, whereas abstract concepts (e.g., FRIENDSHIP) cannot. Additionally, the mind may represent abstract concepts using more introspective, social, and emotional information than concrete concepts. Social difficulties are one defining feature of autism, and alexithymia (difficulty identifying and describing one's own emotions) is more common for autistic people than neurotypical people. To explore possible links between autism, co-occurring social/emotional differences, and thinking about abstract concepts, this study assesses the relationship between autistic-like traits in adults and their definitions of concrete and abstract concepts. Participants gave open-ended definitions for concepts varying in concreteness and social content via an online survey. Responses were coded for social information, interactions between people, and emotional states. Correlational analyses were performed among social/emotional content and measures of autistic-like traits, autistic camouflaging, and alexithymia. Findings may help elucidate social and cognitive differences in autism.

## **Determining the Optimal Design Approach for the Conjugate in the Detection Method**

*Presenter(s): Julie Torres*

*Faculty Mentor(s): Irina Nesterova*

*Session Time: 1 to 2p.m.*

*Poster #76*

*Research Rookie*

This project focuses on utilizing catalase as a signal transduction tool for biotarget detection, aiming to determine the optimal design approach for the conjugate in the detection method. G-quadruplex/hemin platform capable of decomposing hydrogen peroxide into water was employed. High-Performance Liquid Chromatography (HPLC) was utilized to isolate a fraction of the hemin DNA conjugate. UV spectroscopy was employed to assess the folding of the G-quadruplex on the DNA strand. Various buffering systems were tested to enhance the folding process, along with optimizing catalase conditions. The most effective buffering system was identified, establishing a method for systematic hemin-DNA complex formation and determining optimal folding conditions for the G-quadruplex on the DNA strand. The next objective is to characterize the structure of the hemin DNA conjugate using gel electrophoresis and size exclusion chromatography.

## **Hacking Cancer Cell Metabolism**

*Presenter(s): Laurita Uribe Aristizabal and Marco Morales Alvarado*

*Faculty Mentor(s): Linda Yasui*

*Session Time: 2 to 3p.m.*

*Poster #46*

*Student Engagement Fund*

Pro-survival effects of autophagy present “hackable” targets to sensitize cancer cells to radiation exposure, but the multiple steps of autophagy confound the problem. Using evidence from human brain cancer cells that express fluorescent markers for autophagosomes, we found that autophagic flux was impacted by radiation exposure. Armed with this knowledge, we hypothesized that the hackable radiation-sensitive step in autophagic flux is autophagosome trafficking. To test this hypothesis, we collected data on the number or distribution of early and late stage autophagosomes in irradiated or sham irradiated cells as well as the fraction of autophagosomes undergoing fusion with the lysosome (the final degradation and recycling step of autophagy). Image analysis was streamlined using Imaris that seamlessly 3D rendered the image data, detected objects and quantified numerous parameters that estimate autophagic flux to illuminate the radiation-induced changes in autophagic flux that improves cancer cells’ ability to respond to radiation stress.

## **Characterization of an environmentally isolated *Pseudomonas* species as a promising antifungal against *Aspergillus fumigatus***

*Presenter(s): Kathy Valdez*

*Faculty Mentor(s): Ana Calvo*

*Session Time: 11 to noon*

*Poster #43*

*Senior Thesis*

*Aspergillus fumigatus* is an opportunistic human pathogen and is one of the most common fungi to cause disease in humans, particularly in immunocompromised patients where mortality rates range from 40%-90%. *A. fumigatus* usually enters the body through the respiratory tract and can cause invasive aspergillosis. Therapeutic methods are still limited for these infections, and common treatments with azole drugs cause unwanted side effects. Studies have found *A. fumigatus* strains resistant to azole drugs. For this reason, it is imperative to research new biocontrol methods. The isolate *Pseudomonas* 20E11 is an environmental isolate found in aquatic environments. *Pseudomonas* 20E11 shows possible applications as a biocontrol for *A. fumigatus* by inhibiting fungal growth. Through this study, we hope to elucidate the mechanisms of action of *Pseudomonas* 20E11 on *A. fumigatus*. Our current data shows *Pseudomonas* 20E11 has potential as a method of reducing *A. fumigatus* growth and changes in fungal morphology.

## **Detection of Antibiotic Resistant Genes Present in the Water Environment in Dekalb County**

*Presenter(s): Whitney Vanman*

*Faculty Mentor(s): Pallavi Singh*

*Session Time: 2 to 3p.m.*

*Poster #65*

*Student Engagement Fund*

Antibiotic resistance (AMR) poses a significant threat to public health consequently leading to economic and social burdens. This threat arises from the over- and misuse of antibiotics exerting selective pressure on bacteria in the environment, specifically through waterways. This project aims to assess the presence and diversity of antibiotic-resistant bacteria (ARB) and their antibiotic-resistance genes (ARG) in waterways. Systematic sampling from the Kishwaukee River was performed across various regions in DeKalb County. The microbes captured on filters were enriched in broth (TSB for 48 hours) and selectively plated on antibiotic-containing differential media (Chromagar for 18 hours) at 37°C. Preliminary findings indicate an abundance of resistant bacteria implicating the spread of AMR in freshwater ecosystems. Further investigations will unravel the mechanisms of ARGs and ARB persistence in the environment. This understanding is vital for mitigating the spread of antibiotic resistance and protecting human and environmental health in the future.

## **Apologizer Perceptions of their Transgressions in Relation to Apology Completeness**

*Presenter(s): Isabelle Van Winkle and Lexi Alt*

*Faculty Mentor(s): Randy McCarthy*

*Session Time: 11 to noon*

*Poster #27*

When harm is done in relationships, it is common for there to be a lack of apology despite the effectiveness of apologies at repairing relational damage after transgressions; more complete apologies are characterized by a greater number of apology elements (e.g., remorse, acceptance of responsibility, repair, explanation, etc.) (Schumann, 2014). This study looks at the relationship between the perpetrator's perceptions of their transgression and the completeness of their apology. We hypothesized that (a) transgressors who viewed their action as more justified would have less complete apologies; (b) the more extreme apologizers understood their behavior to have been, the more complete their apologies would be; and (c) people's anticipation of how valuable the recipient would find the apology would be negatively related to the completeness of the apology. Data was collected using a survey, and results support these hypotheses. These results provide a framework for future reconciliation approaches.

## **Examining the Effects of Adolescent Binge Drinking on Self-Movement Cue Processing**

*Presenter(s): Kendall Vasquez*

*Faculty Mentor(s): Dominoe Jons*

*Session Time: 10 to 11a.m.*

*Poster #14*

Blankenship et al. (2016) found that adolescents who reported binge drinking showed poorer self-movement cue processing during a dead reckoning task. Additionally, Wolbers et al. (2007) identified findings in the study that suggest abilities in path integration and motion processing relates to processing in the medial prefrontal cortex. In the current study, participants reported drinking habits before completing a virtual task involving locating invisible targets on the screen followed by returning to the starting location once the target is found. This study aims to replicate the findings of Blankenship et al. (2016) with a new self-movement cue processing task. We hypothesize that individuals who report binge drinking within the last 30 days will perform significantly worse in the dead reckoning test than those who do not report binge drinking. Group differences will be assessed using a t.test comparing the length and accuracy of the homeward sections of this task.

### **Anatomy & Physiology Students Perceptions of Learning About Sex and Pleasure**

*Presenter(s): Yaileen Velazquez*

*Faculty Mentor(s): Heather Bergan-Roller*

*Session Time: 1 to 2p.m. Poster #57*

*McKearn Fellowship and Research, Engagement and Academic Diversity Grant*

Undergraduate Anatomy & Physiology (A&P) is an opportune place for future healthcare providers to learn a diversity of health topics, including sexual health. Sexual pleasure is an important aspect of sexual and overall health. Our work with undergraduate A&P textbooks and instructors indicates that this instruction often omits sexual function and pleasure or presents it in exclusive ways. Students' perceptions of learning these topics are important to consider with curricular designing. We analyzed responses from 41 students in an undergraduate A&P course who described their perceptions of learning about sex and pleasure. Using emergent thematic analysis, it was found that students generally responded positively to the idea about learning about sex and pleasure in A&P and expressed themes of comfort, value, and desire to learn these topics. These findings suggest that students welcome A&P curricula that includes sex and pleasure.

### **Sustainable Procurement for Lake County**

*Presenter(s): Shea Walter, Nina Osborne, and Trevor Snyder*

*Faculty Mentor(s): Melissa Burlingame*

*Session Time: 9 to 10a.m. Poster #91*

Lake County, Illinois has partnered with students in ENVS 491 to develop preferred sustainability standards for their updated procurement policy. This group researched current trends in sustainable procurement, completed a benchmark analysis on sustainable procurement, and delivered a set of more than 20 preferred sustainable procurement standards. This project is one of the first to be completed that reviews sustainable procurement and has great potential for Lake County to serve as a sustainability leader in the region and among county governments. Their leadership will help make sustainable procurement the standard practice for government institutions.

### **Patterns of bird-window collisions on the Northern Illinois University campus**

*Presenter(s): Jemma Waldrop and Jackson Steger*

*Faculty Mentor(s): Jennifer Koop*

*Session Time: 10 to 11a.m.*

*Poster #67*

Window collisions by migrating birds are a common issue due to the reflection of habitat off panes of glass. To monitor these collisions, NIU students participated in a multi-year study to collect data on birds stunned or killed after flying into campus windows.

Students conducted daily surveys during migration periods, walking along a set route on campus and checking around each building for stunned or dead birds. We use this dataset to answer two questions: (1) what bird species are most commonly victims of these collisions? And (2) are certain buildings more likely to cause bird collisions than others? The highest rate of collisions were recorded around Montgomery Hall which is located next to a wooded area. The proximity of the building and natural habitat may attract more birds and increase the likelihood of window collisions. The two bird species most frequently observed were Swainson's Thrush (*Catharus ustulatus*) and Tennessee Warbler (*Leiothlypis peregrina*). Continuation of this study will help tailor mitigation strategies that focus on location hotspots and consider species' ecology.

### **Using a Game to Help Students Learn Research Methods**

*Presenter(s): Alexander Warren*

*Faculty Mentor(s): Anne Britt*

*Session Time: 11 to noon*

*Poster #25*

Completing practice problems is most necessary for those still developing a skill but a lot of practice can be boring. Serious games can help overcome this hurdle. They can be fun, challenging, and intuitive whereas a straight lecture may not be. This experiment tests this hypothesis by using a game, inspired by the Wordle game, which provides daily research methods problems that take minutes to complete. When this experiment was carried out in the fall semester, the results were promising, but not all students showed positive learning outcomes. In the subsequent semester, the experiment was run again to test whether added feedback would help more students benefit from the game. Half the participants received elaborate feedback and the other half received only corrective feedback (which was the kind of feedback provided in the first iteration of the experiment last semester). Data collection is ongoing, but the hypothesis is that more expansive feedback will facilitate better learning outcomes.

### **The Response of Parasitoid Wasps to Denatonium Benzoate**

*Presenter(s): Grace Watkin*

*Faculty Mentor(s): Bethia King*

*Session Time: 2 to 3p.m.*

*Poster #62*

*Student Engagement Fund*

House flies are a nuisance to both humans and livestock and can be vectors for pathogenic organisms. At livestock facilities, house fly populations are typically controlled with manure management and chemical controls, such as toxic fly baits.

However, these baits may also attract children and other organisms due to containing sugar (sucrose). To deter children from consuming them, toxic fly baits often contain denatonium benzoate, a bittering agent. The present study tested whether denatonium benzoate repels a natural enemy of the house fly, the wasp *Muscidifurax raptor*. Each wasp was exposed to a solution of 0, 10, 100, or 200 ppm of denatonium benzoate in a sucrose solution, or to plain water, honey or host fluid. Following their exposure to the solution, the wasps' feeding behaviors were recorded over the course of 10 minutes.

### **Neuroinflammation Levels Measured by Microglial Cell Activation**

*Presenter(s): Emma Whitlock*

*Faculty Mentor(s): Linda Yasui*

*Session Time: 9 to 10a.m.*

*Poster #47*

*McKearn Fellowship*

Neuroinflammation is an inflammatory response in the brain caused by different stressors such as irradiation exposures. It is important to note duration and intensity of neuroinflammation levels when determining the impacts of these stressors to the brain. During neuroinflammation, microglial cells become activated to contribute to progression of pathophysiological effects. Cell shape changes in microglial cells specify activation and neuroinflammation. Microglial cells change shape from highly branched, or ramified, shapes (inactivated microglial cells) to more spherical microglial cell shapes (activated microglial cells). The goal of this study is to apply Imaris image analysis software to visualize and quantify microglial cell activation after exposure of a mouse head to 8 Gy of radiation. Imaris 9.1.1 was used to perform 3D rendering and microglial cell segmentation to identify and quantify microglial activation. Unirradiated mouse samples revealed a wide range of sphericity in microglial cells while the treated brains had more spherical microglia.

### **Competing Theories: Helping Students Learn and Construct Psychological Arguments**

*Presenter(s): Iliana Williams and Stephanie Drendel*

*Faculty Mentor(s): Anne Britt*

*Session Time: 11 to noon*

*Poster #21*

In upper-division psychology courses, students need to learn to write arguments about theories and prior research. An evidence-sorter tool designed for seventh-grade science classes (Easley et al., 2023) may help. The tool prompts students to collect evidence for each theory, rate the strength of the evidence, and note how the evidence supports the theory. A pilot study indicated that students needed more support in using the tool. We therefore made two changes to the current study. First, students used the tool on a computer instead of on paper. Second, we made it easier for participants to understand how to complete it. Participants read an excerpt presenting multiple theoretical frameworks. The experimental condition received the tool, while the control was given a blank document for notetaking. We hypothesize that the revised tool will lead to better learning and argument quality over the control condition.

### **Perceived Time Poverty: The Role of Socioeconomic Class**

*Presenter(s): Hannah Welsch*

*Faculty Mentor(s): Alecia Santuzzi, Elizabeth Bohrer, and Rachel Rushing*

*Session Time: 10 to 11a.m.*

*Poster #24*

*Research, Engagement and Academic Diversity Grant*

Time poverty, or the unavailability of free time in an individual's life (Zheng et al., 2021) impacts a large portion of individuals each day. Research suggests that time poverty affects certain groups differently than others. For example, women perceive significantly more time poverty than men (Whillans & West, 2022). The present study utilizes data from a one-time survey collected from Prolific. This research aims to identify differences between perceived time poverty and socioeconomic income. Survey responses are split between low-income, mid-income, and high-income individuals. It is hypothesized that low-income individuals will experience higher rates of perceived time poverty compared to the mid-income and high-income participants. A secondary aim of this research is to establish a more accurate measure for perceived time poverty by conducting a convergent and divergent validity analysis between the primary measure and previously used measures of time poverty.

### **Using Explanation and Evidence to Persuade Study Strategy Selection**

*Presenter(s): James Wulf and Alexis Rogganbuck*

*Faculty Mentor(s): Anne Britt*

*Session Time: 11 to noon*

*Poster #32*

A challenge first-year college students experience is learning when reading from their textbooks on their own. Advanced reading strategies may help. One effective strategy is to generate information while reading. Will exposure to this generation strategy motivate students to select it for future use? Or, do students need to be told an explanation for how it works (explanation) and/or that it has been shown to be effective (evidence)? Based on two pilot studies, we presented persuasive messages prior to the students experiencing this strategy. We also crossed the two types of messages (explanation and evidence) in a single design. We expect to find that those who receive both messages will choose the generation strategy more often than those who do not receive a persuasive message, or those who receive solely explanation or evidence messages. If so, experiencing the benefits of a strategy may not be enough.

### **American Rice in the Portuguese Market during the Eighteenth Century**

*Presenter(s): Olivia Zapf*

*Faculty Mentor(s): Anne Hanley*

*Session Time: 10 to 11a.m.*

*Poster #83*

*Research Rookie*

In the early 18<sup>th</sup> century, rice became an important crop in South Carolina's economy. Literature tends to focus on production, but less is known about the transatlantic rice trade. This paper looks at the broader context of stimuli and disruptions in the South Carolina transatlantic rice trade, including market demand, trade regulation, and

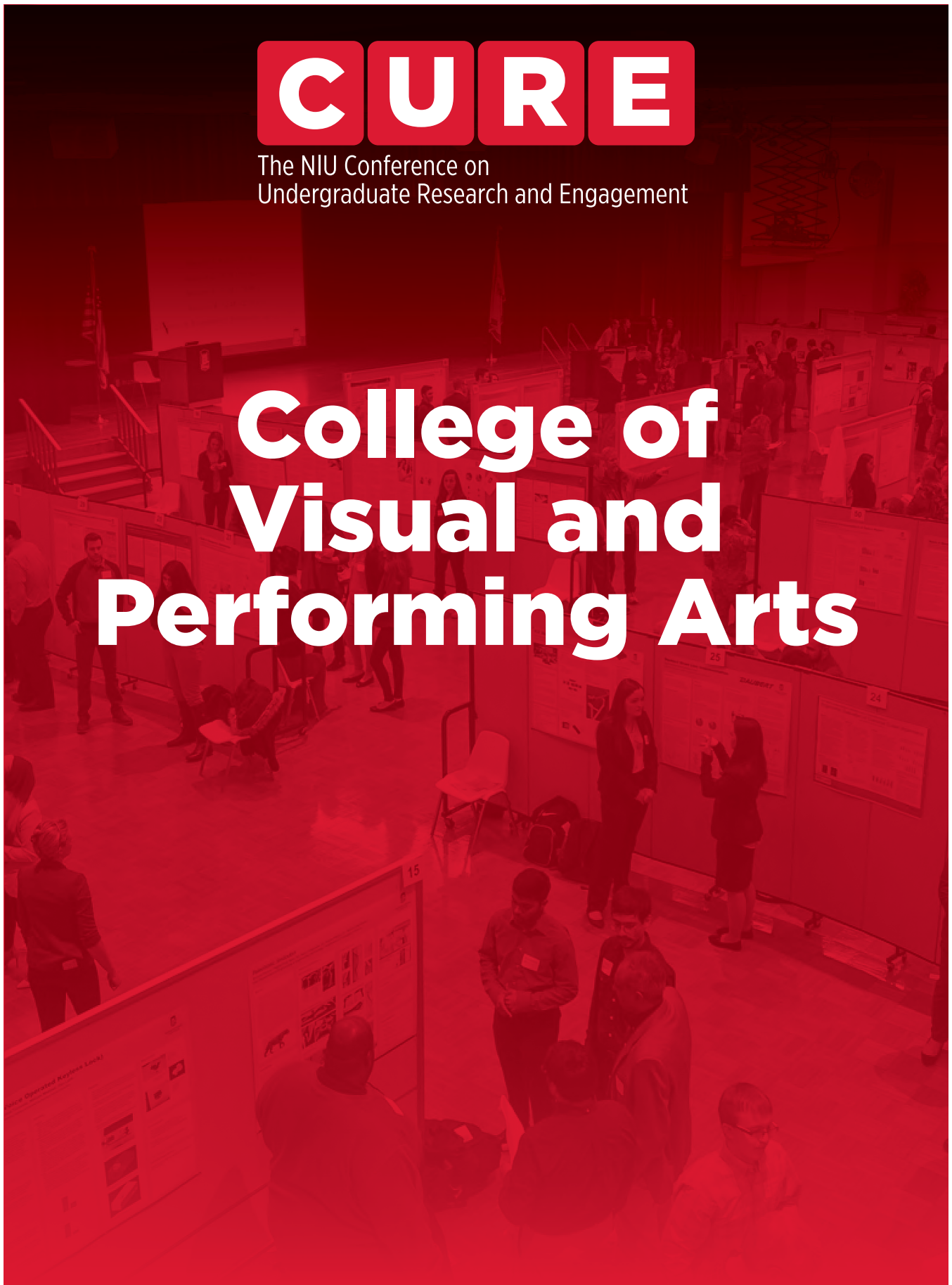


international conflict. This paper seeks to answer the question: how did market demand, trade regulation, and conflict affect the Carolina transatlantic rice trade during the 18<sup>th</sup> century? By looking at existing research and synthesizing key events of this time, this paper provides a relative timeline of key events that caused expansion and disruptions in South Carolina's rice trade. Research finds that consumer demand, regulatory changes, and conflict meaningfully affected the rice trade. This contributes to future research because it contextualizes several aspects of the rice trade and the colony's worldwide relationships.



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# College of Visual and Performing Arts



**Exploring Virtual Reality**

*Presenter(s): Melody Elbel*

*Faculty Mentor(s): Joe Insley*

*Session Time: 11 to noon*

*Poster #89*

*Research Rookies*

This research delves into the creation of virtual reality (VR) environments utilizing Unity's versatile toolkit and an Oculus, blending the disciplines of time arts and computer science. The project draws inspiration from the rise of at-home game development, where beginners learn online and share their creations. 3D modeling, sound, and interactive elements are integrated to craft captivating VR environments. Tasks completed include creating basic VR environments with mountains, trees, and textured layers, and the integration of soundscapes. The programming language C# was used to add interactivity. Despite encountering challenges such as programming joystick controls and addressing issues with gravity, the project has successfully added new assets and textures to enhance environmental detail. Documenting the journey from novice to creator simplifies the entry of aspiring programmers venturing into VR. The ongoing goal is to improve the VR project and expand the accessibility of VR development.

**The Influence of Trade on Navajo (Diné) Weaving Practice in the Twentieth Century**

*Presenter(s): Torrey De Persia*

*Faculty Mentor(s): Rebecca Houze*

*Session Time: 11 to noon*

*Poster #88*

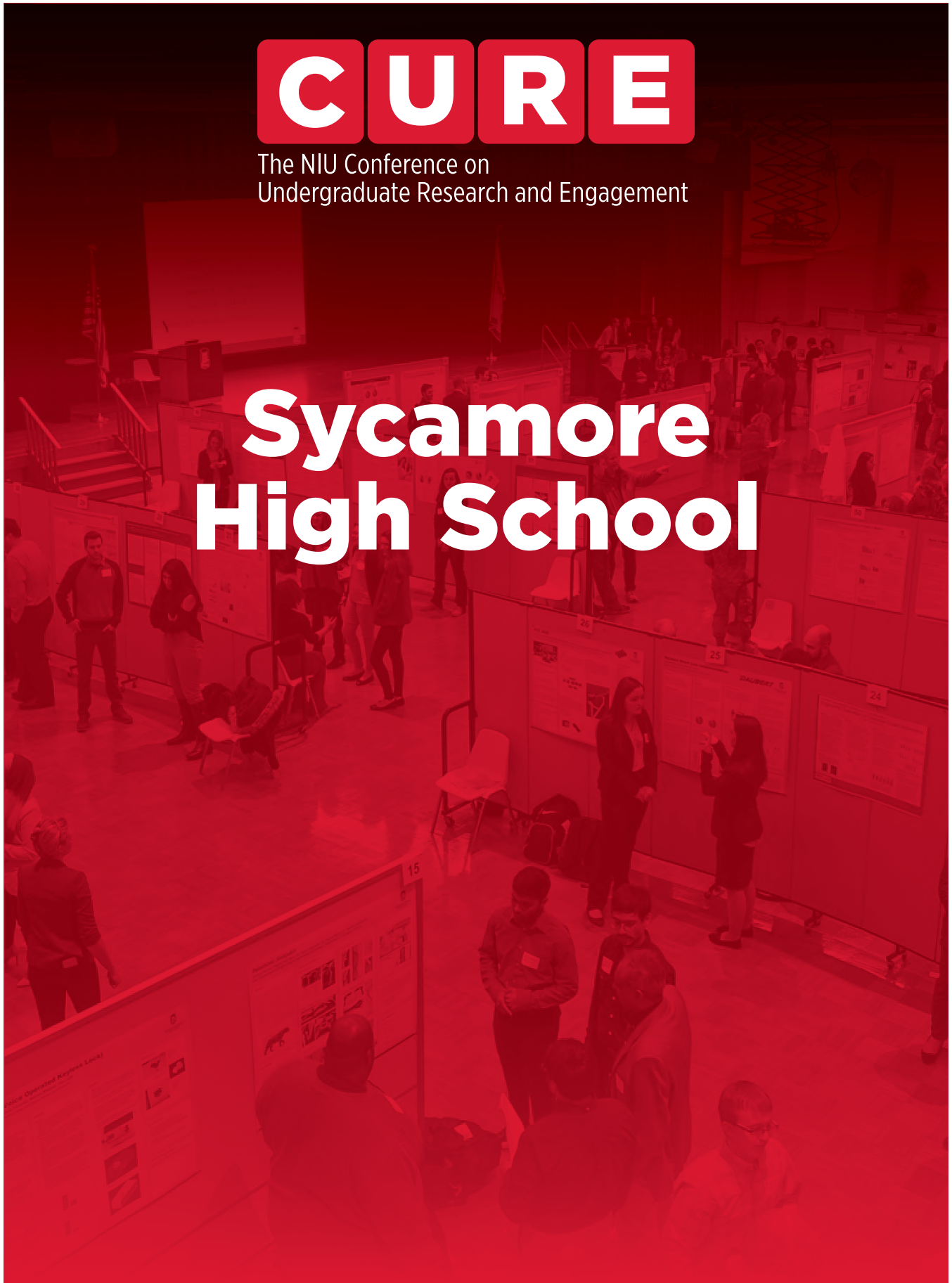
*Honors Capstone and Senior Thesis*

This research is on the modernization of Navajo weaving and the impact it has had on traditional weaving and weavers. Specifically, the project delves into the impact that trade has had on the development of tapestry décor and how commercialization and mass production in the corporate world have affected Navajo weavers.



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# Sycamore High School



### **Creating a Stream Quality Index Using Freshwater Mussels**

*Presenter(s): Kit Horn, and Grace Marsh*

*Faculty Mentor(s): Scott Horlock*

*Session Time: 10 to 11a.m*

*Poster #161*

There are many standardized ways to rate habitats. Plants can be given a coefficient of conservatism, used to calculate a floristic quality index (FQI). The FQI is used to rate the variability and the quality of the habitat. Quality of streams or rivers can be measured using a qualitative habitat evaluation index (QHEI) or a biotic index (BI). QHEIs use abiotic factors to determine habitat quality while BIs use biotic factors to determine habitat quality. The presence of mussels is typically one of many requirements in a BI. This study considers the use of mussel species and mussel diversity to create a stream quality index. Each mussel species was assigned a value, similar to a coefficient of conservatism, which was used to calculate a value referred to as a mussel quality index (MQI).

### **Riparian Width and the Effect it has on Water Quality**

*Presenter(s): Bellamaria Juarez and Biannca Pasillas*

*Faculty Mentor(s): Scott Horlock*

*Session Time: 10 to 11a.m*

*Poster #163*

Studies show that riparian buffers contribute to the improvement of water quality. Brumberg (2020) explains that riparian buffers stabilize the stream banks. This study examined the widths of riparian buffers at different locations within the East Branch of the South Branch of the Kishwaukee River Subwatershed. Riparian widths were compared to qualitative habitat evaluation index (QHEI) scores, pH levels, and nitrate levels. Riparian width showed a strong correlation when compared to QHEI scores, (0.78). However, correlations were weak when riparian width was compared to nitrates(0.15), and pH, (-0.10). Correlations to stream quality and the riparian width indicate that the wider riparian buffers are, the more they improve overall stream quality. Implementing wider riparian buffers next to bodies of water that lack minimum riparian widths, or even a riparian barrier at all, is essential to improving water quality.

### **The Impact of Substrates on Mussel Diversity**

*Presenter(s): Connor Reidl and Amelia Simone*

*Faculty Mentor(s): Scott Horlock*

*Session Time: 10 to 11a.m*

*Poster #162*

Substrate types play an important role in mussel diversity in streams (Elson 2010). This study created a scoring rubric, where six different types of substrates (muck, silt, detritus, sand, gravel, and cobble) were ranked on a scale of one to five based on texture and density. Muck and silt were given a score of 1. Cobble was given a score of 5. Mussel populations within the East Branch of the South Branch (EBSB) of the Kishwaukee River subwatershed were surveyed for diversity and population size. A strong correlation (0.8986) was found between substrate types and living mussel populations. The data suggests that mussels prefer a particular substrate blend. EBSB

at Motel Rd. was given a score of 2.2 and had an average of 28 mussels found, while Virgil Ditch 3 had a score of 2.556 and had an average of 32.333 mussels found.

### **The Effects of Nitrates on Stream Quality**

*Presenter(s): Aiden Saam, Jack Block, Rune Nelson*

*Faculty Mentor(s): Scott Horlock*

*Session Time: 10 to 11a.m.*

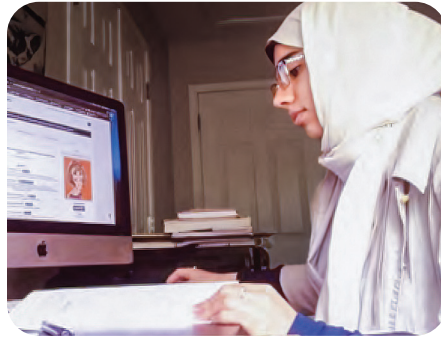
*Poster #160*

This study assesses the effects of nitrates on overall stream quality in the East Branch of the South Branch of the Kishwaukee River Subwatershed. Stevenson et al (1993) state when the agricultural growing season produced less than 10µm of nitrates (NO<sub>3</sub>), the survival of submersed aquatic vegetation in the Chesapeake Bay watershed (SAV) increased. According to Lehigh University, a nitrate-nitrogen level less than 1.0 mg/L is considered excellent. However, when levels exceed this number, plant life gets out of control and can harm the overall watershed. Water samples were tested for nitrate levels and compared to a Qualitative Habitat Evaluation Index (QHEI). No correlation was found between the nitrate levels and the QHEI score.



# CURE

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