Celebrating Undergraduate Research, Artistry and Community Engagement

Tuesday, April 18, 2023, 9 a.m. to 2 p.m.
Holmes Student Center

The NIU Conference on Undergraduate Research and Engagement
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 lifelong 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 Freeman and EVP and Provost Beth Ingram
# Table of Contents

Schedule of Events and Award Categories.............................................................................4  

Event Map................................................................................................................................6  

Judges........................................................................................................................................7  

Poster Session Abstracts

  College of Liberal Arts and Sciences..................................................................................8  
  College of Health and Human Sciences...........................................................................37  
  College of Education..........................................................................................................43  
  College of Visual and Performing Arts.............................................................................46  
  College of Business...........................................................................................................47  
  College of Engineering and Engineering Technology......................................................48  
  Sycamore High School.......................................................................................................49  

Acknowledgements................................................................................................................53
Schedule of Events

Session I 9:00 - 10:15 AM
Session II 10:15 - 11:30 AM
Session III 11:30 - 12:45 PM
Session IV 12:45 - 2:00 PM

Awards

A monetary award will be given to the top three in each of the following categories:

- Social and Behavioral Sciences
- Biological and Chemical Sciences
- Environmental and Physical Sciences
- Education
- Humanities
- Health and Human Services
- Arts, Design and Performing Arts
- Interdisciplinary Studies
- Engineering
- Math and Computational Sciences
- Business and Entrepreneurship
The NIU Foundation warmly invites all CURE symposium faculty, students, and judges to enjoy a complimentary lunch to celebrate those who make the CURE event possible. Drop in anytime between 11:30 a.m.–2 p.m. in the Regency Room.
POSTER LOCATIONS

CAPITAL ROOM
-Social and Behavioral Sciences
-Health and Human Services

Refreshments in Capital Room

GALLERY LOUNGE
-Biological & Chemical Sciences
-Engineering
-Environmental & Physical Sciences

GALLERY GLASS
-Education
-Humanities
-Arts, Design and Performing Arts
-Business and Entrepreneurship
-Mathematics and Computational Sciences

REGENCY ROOM
-Foundation Drop-in Luncheon, 11:30-2:00PM

Presenter and Judge Check-in outside of the Capital Room
Judges

- Abul Azad, CEET
- Alissa Droog, University Libraries
- Anitha Saravanan, Nursing
- Anna Forba, Counseling and Consultation Services
- Becca Husar, College of Business
- Brad Wiles, University Libraries
- Chris Hill, KNPE
- Christopher McCord, Mathematical Sciences
- Dawn Zebic, Meteorology
- Dee Anna Phares, University Libraries
- Denise Schoenbachler, Marketing
- Donald Zinger, Electrical Engineering
- Emerson Sebastiao, KNPE
- Fatima Cruz Montenegro, Alumni
- Farah Ishaq, KNPE
- Gregory Pucci, Community Affiliation
- Gwen Gregory, University Libraries
- Irina Nesterova, Chemistry and Biochemistry
- Jennifer Koop, Biological Sciences
- Jessica Reyman, English/Graduate School
- John Butler, Board of Trustees
- Katja Wiemer, Psychology
- Kevin Palencia Infante, Mathematical Sciences
- Kevin Wright, NNGO
- Khadija, Educational Psychology
- Kim Gatz, Communication
- Kimberly Shotick, University Libraries
- Larissa Garcia, University Libraries
- Leanne VandeCreek, University Libraries
- Leslie Matuszewich, CLAS
- Lisa Liberty, College of Education
- Madeleine Stucky, Center for Nonprofit and NGO Studies
- Mariana Ricklefs, Curriculum and Instruction
- Martin Bourke, Public Administration
- Marymargaret Sharp-Pucci, Professor/Alumni
- Masih Shokrani, School of Health Studies
- Megan Brown, Earth, Atmosphere and Environment
- Melissa Burlingame, Environmental Studies
- Nancy Prange, School of Health Studies
- Natalie Joy, History
- Nina Mounts, Psychology
- Olivier Devergne, Biological Sciences
- Patricia Wallace, Psychology
- Peter Chomentwoski, KNPE
- Pi-Sui-Hsu, Educational Technology, Research and Assessment
- Rachel Donegan, SEED
- Scot Schraufnagel, Political Science
- Steven Alban, Alumni
- Taylor Atkins, History
- Tom Koeppen, Retired Alumni
- Vitor Siqueira, KNPE
- Wendell Johnson, University Libraries
- Xueying Lu, Physics
- Yessenia Chavez, Psychology
- Yujun Liu, Human Development and Family Sciences
Nucleic acid scaffolds can fold into catalytically active conformations known as DNAzymes. DNA G-quadruplexes are notorious for enhancing the catalytic activity of hemin. The ability of nucleic acids to change conformation into the catalytically active form upon a target recognition has been engineered into a range of molecular diagnostic platforms. In this research project, we develop a system for visual signal transduction in biomarker detection. The new detection platform is based on an artificial activatable catalase enzyme. It is based on an oligonucleotide scaffold that binds and activates hemin to catalyze the decomposition of hydrogen peroxide. Hydrogen peroxide decomposition yields oxygen that is released in the form of bubbles. Bubbles can be detected either through the naked eye or under a microscope. When done by the naked eye, which is the visualization technique used in this project, it is a straightforward and easy to interpret route towards instrument-free visualization, and no scientific training is required. Thus, we work to develop an inexpensive and instrument-free platform for detecting clinically meaningful biomarkers such as antibodies and nucleic acids. The catalytic system consists of oligonucleotides that fold into G-quadruplex structure. G-quadruplexes are nucleic acid tetraplexes consisting of guanine-rich sequences. We will develop a scheme where a biomarker detection event results in folding of G-quadruplex into an active enzyme conformation.

Relationship Between Shyness Mindset and Distress During Ostracism: Is Anxiety a Mediator?
Presenter(s): Hajer Alamidi and Amanda McCumsey
Faculty Mentor(s): Nina Mounts, Psychology
Session Time: 9:00-10:15AM; Poster Number: 17

There is an increase in the onset of anxiety disorders during the early adolescent period (Rapee et al. 2019). Research on shyness mindset (SMS) indicates that shyness mindset may be related to anxiety (Valentiner et al. 2011) and perceptions of shyness as unchangeable are related to negative reactions to social situations (Valentiner et al., 2011). This investigation examines whether the relationship between SMS and adolescents’ distress responses to virtual social ostracism (Cyberball), as reported by adolescents and their mothers, is mediated by anxiety. There are three research questions. First, are there reporter differences in Cyberball? Second, are there sex differences in the variables of interest? Finally, is the relationship between SMS and Cyberball mediated by social interaction anxiety (SIA), social phobia (SP), and anxiety (AN)?

Who bit Smilodon? A tale of attempted murder at Rancho La Brea
Presenter(s): Diana Alvarez
Faculty Mentor(s): Virginia Naples, Biological Sciences
Session Time: 12:45-2:00PM; Poster: 92
McKearn Fellow

Direct evidence for interaction among extinct species is difficult to obtain because the animals no longer interact. Fossil specimens are often incomplete because most soft tissues have been lost or show damage. Therefore, conclusions regarding what any animal did may be impossible to determine. A proxy for interpreting behavior can be achieved, however, if it is possible to identify physical traces left by animals interacting while they were still alive. There are many different types of traces. These include skin and organ impressions, tracks, scratch and other kinds of marks from claws or teeth left in impressionable substrates and scars in skeletal elements of fossils. These latter are often attributed to bites from other animals, whether conspecifics or not. This study identifies which species interacted with the Smilodon fatalis individual represented by the skull found at Rancho La Brea, the tar pit in Los Angeles. This individual shows a hole in the outer surface of the frontal bone on the left side that could be a bite mark. To determine whether this is correct we examined the other species found in the same location. Taxa that could have bitten our specimen include Arctodus simus, the short-faced bear, other Smilodons, Canis dirus, the dire wolf, and Panthera atrox, the American jaguar. For each of these species we examined the overall size, length, degree of anterior and posterior curvature and anteroposterior and mediolateral thickness of the canine teeth. The goal was to determine which, if any of these teeth, fit the hole in the skull. We discovered that only a
moderately worn upper right canine tooth of an individual of *P. atrox* fit the defect in the skull well. This tooth matched the diameter and shape of the opening perfectly. We can therefore conclude that an American jaguar bit *Smilodon*.

**Cognitive processing styles in semantic memory organization**

*Presenter(s): Blake Atterbury*

*Faculty Mentor(s): Katja Wiemer, Psychology*

*Session Time: 11:30-12:45PM; Poster Number: 18*

*Research Rookie*

Semantic memory can be categorized into taxonomic and thematic relations, which allow the human mind to create meaning between various entities. Taxonomic relations express commonalities (e.g., coffee and milk are beverages); thematic relations express complementary roles in a situation or schema (e.g., you add milk to coffee). Two computational frameworks have accounted for how our memory manages to represent these different relations: The Controlled Semantic Cognition theory and the Dual Hub model. The Dual Hub model purports that taxonomic and thematic relations are processed in two separate brain regions. Adversely, the Controlled Semantic Cognition theory proposes that one brain area represents both taxonomic and thematic relations, while a separate area controls access to both selectively, depending on the task demands. Research has demonstrated that individuals vary widely in their use of thematic processing. Although some of these differences are cultural, Nisbett and colleagues have proposed that field dependency (or wholistic processing) increases thematic processing relative to field independence (or analytic processing). We will present a correlation analysis between field dependency (using an embedded figures test and a cognitive style indicator) with the use, and ease of use, of thematic relations when processing pairs like coffee – milk, while instructing half of the participants to focus on the thematic relation, and half to focus on commonalities. From this, we can understand more about the connection between cognitive style and semantic processing, using thirty-six word pairs (18 concrete and 18 abstract). We hypothesized that participants who were more field independent would rely on thematic relations less, especially when prompted to rate commonalities, and would access taxonomic relations faster in memory, resulting in faster responses.

**Psychiatry in Victorian and Edwardian England**

*Presenter(s): Ilona Bentsiwah*

*Faculty Mentor(s): Trude Jacobsen-Gidaszewski, History/ Center for Southeast Asia*

*Session Time: 12:45-2:00PM; Poster: 75*

*Research Rookie*

Psychiatry underwent a revolution in the 19th century. Instead of chaining the mentally ill in dungeons or mocking their behavior like they would usually do, doctors made a change and began to treat patients humanely. They started recommending warm baths, good food, and different activities to try and reorient their minds. All the same, the class distinction of Victorian England remained in place despite the new impetus to treat such people with kindness. Along with the changes in treatment approaches, new buildings were built that offered patients fresh air, space to walk and play games, and leisure pursuits. One of these was the Holloway Sanatorium opened in 1885. The case books of Holloway’s Sanatorium, in which the psychiatrist wrote their notes on each patient, have been digitized by the WELCOME Trust and provide a wealth of information as to the manifestations of mental illness in Victorian England and how these were treated. This project looks at the specific casebook, containing male patients who are admitted in 1891 and 1892.

**Isolating and Cloning DNA to better understand how the Geminiviruses hijack their hosts.**

*Presenter(s): Cole Boni*

*Faculty Mentor(s): Garry Sunter, Biological Sciences*

*Session Time: 11:30-12:45PM; Poster: 102*

*Research Rookie*

The purpose of this research is to determine, by isolating segments of and cloning DNA, how a specific type of virus called a Geminivirus infects a plant host. Specifically, we want to identify and understand the role of plant genes in targeting geminiviruses for degradation through one of its defense mechanisms called autophagy. The gene being investigated in this research is a regulatory gene called rgs-CaM. The methods include isolating a circular DNA from E.Coli, replicating it, and
then cutting it into specific fragments. Afterwards, the circular DNA is cut into a line and has its ends removed, where then the fragments are joined together. The reaction is then introduced to E. Coli, where cell cultures are grown, isolated, and replicated. This is then introduced into plant cells and its activity is recorded. The research is still in progress, as such, the main conclusions revolve around using positive-negative tests to determine the presence of DNA, and tests to determine its concentration and if it is contaminated, before continuing to the next step in the procedure. The amount and intensity of Geminivirus infections in plants has increased in the last two decades, and the damage caused by these viruses can result in 100% crop yield due to the symptoms that develop in the plant. Therefore, this research can give better insight into how Geminiviruses hijack their hosts, which can in turn help develop strategies to fight them.

**How Does Using Drawing Strategies or Causal Models Help Students Learn Natural Scientific Processes?**

*Presenter(s): Skyler Brackett*

*Faculty Mentor(s): Anne Britt, Psychology*

*Session Time: 9:00-10:15AM; Poster Number: 10*

Whether in classwork or in everyday life, students need to make connections among causal relations when reading about how scientific processes work (e.g., how coral becomes bleached). However, research demonstrates that comprehending scientific explanations can be challenging (Leopold & Leutner, 2012). Prior studies indicate that translating read material into a picture helps readers form a deeper understanding of the text (Van Meter, 2001). Therefore, students may require further support when forming connections among causal relations within explanations. Two methods for supporting comprehension of scientific explanations are drawing a picture of the scientific process (e.g., drawing of algae and coral) and drawing a model of the causal elements from the scientific process (e.g., sequential construction of causal events). Our study incorporated a 2 Drawing (Drawing, no drawing) x 2 Causal Modeling (Causal modeling, no causal modeling). The no drawing, no modeling condition served as the control group. All but the control participants completed a training tutorial with sample explanatory texts and practiced a strategy corresponding to their respective condition: Drawing focused on labeling objects, captions, and arrows to indicate motion. Causal modeling focused on causal language, explanatory completeness, and making inferences. The control condition simply re-read the text. After training, all participants read four to-be-learned science explanations. Comprehension of these four explanations was tested through a multiple-choice test. Analyses are still ongoing.

**Feminist Retellings of Homer's The Odyssey, 2005-2022**

*Presenter(s): Brenna Bretzinger*

*Faculty Mentor(s): Timothy Crowley, English*

*Session Time: 9:00-10:15AM; Poster: 69 Honors Capstone*

Over the past two decades, there has been a significant increase in the number of feminist retellings of Greek mythology. These retellings serve to give voice to the marginalized female characters from ancient stories whose characterizations were deprioritized over their male counterparts. Furthermore, these stories connect the plights of ancient women with modern feminists to champion issues that women continue facing today, from sexualization of their bodies to barring women from leadership roles on account of their gender. This study focuses on retellings of Homer's *The Odyssey* to keep discussions focused on one story, but these ideas and arguments are still largely applicable to other retellings of Greek mythology. Along with discussing *The Odyssey* and its portrayal of female characters like Penelope and Circe, this project also analyzes three feminist retellings: Margaret Atwood's *The Penelopiad* (2005), Madeline Miller's *Circe* (2018), and Claire North's *Ithaca* (2022). Most of this project focuses on analyzing each novel's text in relation to secondary sources about them and about feminist ideals more broadly; however, especially in the case of *Ithaca*—on which no scholarly research exists because of its recent publication date—papers on the evolution of feminist theory and interview with the authors themselves have also been included. Atwood's novel contains somewhat outdated feminist theory that offers generalized scathing reviews about patriarchy without embodying its own criticisms or engaging in nuanced ideas of intersectionality. *Circe* and *Ithaca* apply these more recent aspects of the feminist movements but offer opposing ideas on motherhood and on the reality of gaining justice in sexual assault cases. Each novel grapples with evolving ideas of
feminism to explore feminine identity and advocate for issues that women continue to face thousands of years later.

The G-Signaling Protein Rcp Controls the Polarized Basement Membrane Deposition in Epithelial Cells
Presenter(s): Rebecca Brnot
Faculty Mentor(s): Oliver Devergne, Biological Sciences
Session Time: 10:15-11:30AM; Poster: 99
Honors Capstone

Epithelial tissues are the most common type of tissue in the human body, forming the outer layer of the skin and most organs. They are composed of epithelial cells and rely heavily on their cellular architecture, which is organized by an apical-basal polarity, for their function. One critical component for the establishment and maintenance of the epithelial cell architecture is the proper placement of the basement membrane (BM). The BM is a specialized sheet within the extracellular matrix that lines the basal side of epithelial cells. There is a biological pathway dedicated to the proper placement of the BM. This pathway controls the production of BM proteins within epithelial cells and basally secretes them from these cells to the BM. Despite the BM’s important role in epithelial cell organization and polarity, the biological pathway dedicated to the polarized secretion of BM proteins is poorly understood. To study BM deposition, we use the follicular epithelium (FE) of the Drosophila ovary as a model system. In a genetic screen looking for genes involved in the proper placement of BM proteins, we identified a new gene, Rcp (Receptor component protein), which has been shown to be involved in G-protein signaling. It has been shown that the loss of Rcp leads to the mislocalization of BM proteins to the apical side of FE cells. We identified two Rcp mutant lines, FM60 and R55.2, that frequently display mislocalization of the BM proteins to the apical side of FE cells. Additionally, using immunostaining and super-resolution microscopy, we determined that Rcp localizes in the cytoplasm and the nucleus of epithelial cells. Altogether, our results identified two Rcp mutant lines that affect the normal polarized deposition of BM proteins and identified the intracellular localization of Rcp within epithelial cells.

Anticipated Stigma & Anxiety Among Employees with ADHD In the Workplace
Presenter(s): Melissa Caballero
Faculty Mentor(s): Alecia M. Santuzzi, Psychology
Session Time: 10:15-11:30PM; Poster: 36

Workers with invisible disabilities can face barriers that individuals without these disabilities do not. The goal of this study is to gain a better understanding of the daily work experiences of employees with neurodivergent characteristics. In this study, Attention-Deficit Hyperactivity Disorder (ADHD) is the focus. In this voluntary study, employees with ADHD were asked to complete a baseline survey and two surveys per day for 8 days during and after work hours. Lower levels of anticipated stigmatization of ADHD in the work environment will predict lower levels of anxiety among workers with ADHD. These findings hold implications for further research on the influence of anticipated stigma and levels of anxiety.

Motivating Students to Select Effective Study Strategies
Presenter: Caitlin Callahan
Faculty Mentor(s): Anne Britt and Amanda Durik, Psychology
Session Time: 9:00-10:15AM; Poster Number: 2

There are a lot of good learning strategies that are empirically supported to be effective (Dunlosky et al., 2013), but students do not use them (McDaniel & Einstein, 2020). Will exposure to the contrasting strategies motivate students to select a more effective strategy for future use? Prior research has shown that having students use an effective strategy, compared to their usual strategy, leads to many students spontaneously using the more effective strategy (Storm et al., 2016). However, all of this work has been done with learning constructs and definitions. We wanted to target deeper learning of theories and studies. One method developed by Britt et al. (2017) for learning theories is a steps chart. Our first research question was to test whether the steps chart helps students learn theories beyond taking notes. This steps chart was found to be effective in a classroom over an entire term (Britt et al., 2023), but we want to test it in a single experimental setting. Our second research question was whether exposure to the more effective strategy would be enough to get students to
select this new strategy for learning a new text. Students read an excerpt from a psychology textbook using both strategies and then took a multiple-choice test after each strategy. Then, they were given a chance to read another psychology text excerpt but were able to select which strategy they wanted.

Examining the Moderating Effects of Gender on Leadership Identity Maintenance and Turnover
Presenter(s): Adonis Cameron
Faculty Mentor(s): Rachel Saef, Psychology
Session Time: 12:45-2:00PM; Poster: 34

Women face many barriers in the workplace, especially women in leadership positions as evidenced by the higher rate at which women (as compared to men) leave leadership positions. While there is a business case for having women in leadership positions, the literature fails to outline the contexts and antecedents that lead to this. Towards this goal, we investigated the process of leader identity development as one mechanism explaining gender differences in leadership experiences. Specifically, we test whether women do not receive social recognition of authority from followers (i.e., follower grants) when they claim authority (e.g., introduce themselves as in charge). In this study, we manipulated leader claims and leader gender to test the moderating effect of leader gender on the link between leader claims and follower grants. We found evidence that follower behaviors are influenced by the direct behaviors of leaders.

Strides in the dark: Effects of arena size on open field behavior
Presenter: Nathan Campbell
Faculty Mentor(s): Doug Wallace, Psychology
Session Time: 9:00-10:15AM; Poster Number: 6
Honors Capstone

The scale of an environment has been argued to influence human and rodent spatial representations. Previous research has suggested that spatial cells have different firing characteristics depending on the size of the environment. However, only a few studies have examined the effects of varying environment sizes on the organization of open field behaviors in rodents. Therefore, the current study investigated the effects of varying environment sizes on movement organization and home base stability. Female (n=12) and male (n=12) C57BL/6 mice were exposed to circular tables that varied in diameter, from 80cm to 198cm. Both sessions were conducted under completely dark conditions with the order of arena size counterbalanced across mice. A black tab (20x5cm) was placed along the edge of the arena, serving as a tactile cue for the mice. A motion capture software was used to track and segment movements into stops and progressions to create measures sensitive to locomotion and spatial disorientation. The results show that changes in arena size influenced multiple characteristics of open field behavior organization. Understanding the representation that guides spatial movements may lead to interventions that will help humans encode environmental information, critical for improving spatial orientation. This work establishes a foundation to better understand spatial disorientation associated with many neurological disorders.

Expression of Genes from Pseudomonas 20EI1 Associated with Monoraphidium Dek 19 Algae Death
Presenter(s): Maya Carey and Haniel Mngodo
Faculty Mentor(s): Scott Grayburn, Biological Sciences
Session Title: 11:30-12:45PM; Poster: 91
Honors Capstone

Algae are abundant and diverse life form. They produce oxygen, which is essential for human life, and remove carbon dioxide from the atmosphere and convert it into biomass. Algae are the basis of many aquatic food webs. Some algae can produce harmful algal blooms that can cause massive death of fish and other critical organisms. Additionally, some algae contain high levels of fatty acids (oils), which can be used for biodiesel production. There are several microbes that produce algicides, or chemicals that kill algae. However, algae are hard to break apart due to their cell walls. But there are certain algicides that can break algae cell walls and release fatty acids. These algicides may also reduce the production of algal blooms. A bacterium from the NIU lagoon (Pseudomonas 20e11), was previously shown to form clear zones of dead algae in plate assays. Clear zones extended past the
areas showing bacterial growth. Current studies extended these observations and identified genes that may be involved in production of algicides.

**Which restoration methods are more likely to promote an environment's plant biomass production?**

*Presenter(s): Nari Coleman*

*Faculty Mentor(s): Holly Jones, Biological Sciences*

*Session Time: Poster: Research Rookie*

Ecological restoration methods have the ability to return an ecosystem to its historical trajectory and transform environments that are affected by degradation, damage, and destruction. Therefore, a common goal for the restoration of any functioning ecosystem is to recover natural processes to the point where assistance from restoration practitioners is no longer needed. Some types of restoration methods include natural regeneration, which is a more passive approach compared to reforestation which is a more active method that involves the plantation of native seedlings and plants. Plant biomass is the dead or alive vegetation that is produced from the trees or shrubs in the environment, the above ground biomass production prioritizes plant species richness and diversity. Recovery efforts consider all environmental interactions when assessing the trajectory of an ecosystem's development. To understand the complex dynamics that influence biomass production, it is necessary to investigate how restoration can impact the growth rate of native plant species within recovering ecosystems. By analyzing which restoration methods are more efficient in stimulating and maintaining biomass productivity it demonstrates the importance of restoration methods against ecological stressors, environmental degradation, and climate change. The methods for the analysis included extracted standardized data of plant biomass using response ratio from a meta-analysis metric involving eleven different studies. The results concluded biomass production increases more after a disturbance ends in ecosystems that have undergone active restoration, compared to passively recovering ecosystems. If we can identify where active interventions help ecosystems recover more completely, we can prioritize where to spend limited restoration funds. Future research will expand this analysis by including more studies, more ecosystems, and seek to understand how restored ecosystems recover following climate stressors.

**Genetic Mapping and Phenotypic Analysis of the *Drosophila melanogaster* Mutant B.4.1.**

*Presenter(s): Hayley Collier and Itzel Mendoza*

*Faculty Mentor: Oliver Devergne, Biological Sciences*

*Session Time: 12:45-2:00PM; Poster: 101*

*Research Rookie (Hayley)*

The regulation of cell growth and proliferation is critical for the development and physiology of a multicellular organism. Importantly, it has been shown that cancerous tumors are associated with the loss of the regulation of cell growth and proliferation. To identify genes involved in the control of tissue growth, we use *Drosophila melanogaster* (fruit fly) as a model system. *Drosophila* is a powerful model organism to study genes important for the development of tissues and organs, including tissue growth. The *Drosophila* genome is 60% homologous to the human genome and 75% of the genes responsible for human diseases are found in *Drosophila*. To identify new genes involved in tissue growth, a forward genetic screen was performed using the *Drosophila* eye as a model system. From this genetic screen, we identified a mutant line named *B.4.1* that affects eye growth. This semester in the Genetics lab, we are characterizing and mapping the *B.4.1* mutant line, in collaboration with other universities as part of the Fly-CURE. The data show that the *B.4.1* mutation leads to an increase in tissue growth in the eye suggesting that the gene affected by this mutation is required for the negative control of tissue growth. In parallel, we also mapped the genomic location of the *B.4.1* mutation to 8 genes using complementation mapping. These genes are sequenced to identify which of these genes is affected by the *B.4.1* mutation. Altogether, these data will have an impact on the knowledge of the genes that are important for the regulation of tissue growth, and, consequently, gene mutations that cause cancer.
Teasing in one of the many ways that people communicate with their friends. Not all people take teasing in the same way. Some people might get offended at comments when the same comment could make another person laugh. Off-record markers play a huge role in teasing as they signal the offensive joke as being not malicious or harmful. Some examples of off-record markers are smirking while playing a joke or winking. Even laughing is considered an off-record marker. Without off-record markers present within a vignette, we hypothesize that people will often get offended which will lead them to stop being friends with the other person. We also hypothesize that if the interaction with their friend is private so a one-on-one interaction, they will be more likely to confront their friend and express their feelings of being upset.

Effects of Instructions on Thematic and Taxonomic Processing
Presenter(s): Wyatt Diehl and Brandon Evenson
Faculty Mentor(s): Katja Wiemer, Psychology
Session Time: 12:45-2:00PM; Poster Number: 13

Taxonomic relations are defined by shared features of things, whereas thematic relations focus on complementary roles of things within a scenario. Our use of these relations varies by person and by task demand. This experiment tested how prompting for either commonalities (taxonomic) or relationships (thematic) would affect participants’ access to each type of relation. The single-hub model of semantic memory (Ralph et al., 2017) states that both thematic and taxonomic knowledge are stored in one memory system, but that task demands (such as the instructions) will make one of the two more accessible. This model predicts relatively faster ratings if participants evaluated the word pairs as instructed (e.g. they are faster to judge that cat and mouse are related, if the instructions ask about relations, and their rating is in fact based on the prey - relation vs. a commonality). The competitor dual hub model (Schwartz et al., 2011) predicts that instructions should not influence these variables. The data were analyzed with an ANOVA to test the effect of the instructions. Participants rated either the relatedness or the commonalities of item pairs that afford both relations (e.g. cat - mouse are both animals, and are related by a chasing action.). They then provided explanations of their ratings, which were coded as taxonomic (e.g. a commonality is named) or thematic (e.g. they identify a relation). Response times to the ratings were measured to assess how easily participants could access the information in memory.

Scrupulosity Measured Across the Abrahamic Religions
Presenter(s): Stephanie Drendel and Mauve Kazeze
Faculty Mentor(s): Kevin Wu, Psychology
Session Time: 9:00-10:30AM; Poster: 35

Scrupulosity is an obsessive-compulsive presentation in which symptoms are focused on moral or religious themes (Siev et al., 2017). Christians report elevated levels of scrupulosity compared to members in other religions (Huppert & Fradkin, 2016). Scrupulosity is positively correlated with religiosity (Henderson et al., 2022) and negative affect (Olatunji et al., 2007). Two questionnaires of scrupulosity (Dimensional Obsessive-Compulsive Scale [DOCS-SR] and revised Penn Inventory of Scrupulosity [PIOS-R] are strongly correlated, but minimal research directly compares their performance. We hypothesized across three religions that (1) Christians would score highest on the DOCS-SR and PIOS-R; and (2) scrupulosity, as assessed by both the DOCS-SR and PIOS-R, would be positively correlated with religiosity and negative affect.

Results support that scrupulosity is positively correlated with religiosity and negative affect, and that the DOCS-SR and PIOS-R provide similar results for assessing scrupulosity symptoms across these three religions. Previous conclusions that Christians reported the highest level of scrupulosity did not include large samples of Muslims, which may explain the unexpected group differences found here. Future research must include sufficient samples of traditionally underrepresented groups.
Marital Satisfaction and Child Outcomes: Symptoms of Anxiety and Oppositional Defiant Disorder in Adolescents
Presenter(s): Zachary Dresch
Faculty Mentor(s): Psychology
Session Time: 10:15-11:30AM; Poster: 27

Marital satisfaction and child psychological outcomes are often associated negatively in existing research (Cox & Paley, 1997). These child outcomes can be both internalizing (i.e., depression, anxiety, social withdrawal); Papp, 2012) and externalizing (i.e., oppositional defiant disorder (ODD), aggression; Massar & Patil, 2020). In this study, marital satisfaction and children's symptoms of anxiety and child oppositional defiant disorder were assessed at two time points. We hypothesized that marital satisfaction at Time 1 would be negatively associated with child anxiety and child ODD at Time 2 and that child anxiety and child ODD at Time 1 would be negatively associated with marital satisfaction at Time 2. Exploratory research questions were also asked examining whether the associations varied based on either parental or child gender.

Reactions to Police Encounters: An EDA Study
Presenter(s): Judith Facio
Faculty Mentor(s): Katja Wiemer, Psychology
Session Time: 11:30-12:45PM; Poster Number: 15

Drivers tend to reduce their speed in the presence of police vehicles. We explored the reactions of drivers to different traffic scenes, and explore the connection to their race/ethnicity, gender, past experiences with police, and driving experience. Past research has provided strong indicators that certain groups experience more worry and anxiety about police brutality. One study found that people of color worry about police violence five times more than whites. It also reported that males worry about police brutality more than females and that younger people worry more than older people. Some studies demonstrate how perceived racial discrimination is consistent with short and long-term physical and mental harm. However, few studies have explored the physiological effects of this on drivers. The impact of race, gender, and driver experience on alertness in road situations involving either a hazard (e.g., snow), police presence, or neutral scenes was tested using Electrodermal Activity (EDA). Participants made responses to a slideshow of traffic scenes from a driver’s perspective. Each photo was presented for five seconds. Participants were asked to respond out loud if they would “go,” “slow down,” or “stop” in each scenario while their skin response was measured. After the task, demographic factors and driving experience were assessed. Alertness responses across the three types of scenes will be presented along with the response patterns. Previously, a link between race/ethnicity and police was explored through written responses of how the driver would assess the situation. In the recent study, we examined links between EDA responses and demographic variables concerning police images.

Engaging Older Adults in Local Nonprofit Nutrition Assistance Programs: Understanding Barriers and Exploring Opportunities for Improved Participation
Presenter(s): Amber Godinsky
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies
Session Time: 11:30-12:45PM; Poster: 55

The rapidly growing population of older adults in the United States is set to require a highly skilled and specialized healthcare response to control the threat of a public health crisis. Research on approaches to mitigation suggests the need for an emphasis on preventative measures such as health promotion and nutrition intervention to be used as vital tools in local communities. This case study on older adults residing within DeKalb County, Illinois offers insight into the accessibility of nonprofit nutritional assistance programs by providing a local snapshot of the barriers to participation in a preventative health resource. Methods of collecting data include interviews with current nutrition program participants and non-participants from four cities ranging in population density and proximity to local nutrition program sites within the county and quantitative data from Meals on Wheels of America’s annually published reports. This study aims to find additional information on the plausibility of barriers impeding older adults’ access to preventative health resources while also revealing opportunities for improvement and advancement in the domain of nonprofit program design and implementation.
The Lao Diaspora: Cultural Identity in America  
Presenter(s): Desiree Griffin  
Faculty Mentor(s): Trude Jacobsen-Gidaszewski, History/ Center for Southeast Asia  
Session Time: 9:00-10:15AM; Poster: 74

From 1 November 1955 until the fall of Saigon on 30 April 1975, the countries of Vietnam, Laos, and Cambodia found themselves thrust into conflict and onto the international world stage. The Vietnam War had detrimental effects upon the communities within these countries with mass diaspora to escape the rising violence as war spread. Fleeing their homeland many from the Lao communities had to navigate life in a foreign country, adapting to customs and cultures that were outside their own identities. The purpose of this research was to record and observe how those who settled into the United States maintained their culture, the problems encountered by meeting Western ideologies, and utilizing the resources offered to help and support these diaspora groups. Previous research done proved difficult at times as some involved desired to maintain anonymity, had personal ties in Laos that could be jeopardized by participating, prejudice experienced due to racial tensions, and experiencing high socio-economic disparity within the United States added a hindrance. The methods used were primarily first-hand accounts by conducting in person interviews, cataloging the experiences from a range of demographics, and collecting the oral histories of those within the Lao community. This research led to the conclusions that many formed small, close-knit groups to keep their culture alive, and maintain a connection to families, identities, and with their homeland in Laos. Many experienced prejudice and discrimination from government agencies, medical entities, and while searching for jobs or careers. The significance of this work is to contribute to the growing body of work that is being done to preserve diaspora communities’ native culture, raise conversations on how foreign groups are treated, the resources that are available to them, to understand and dispel cultural prejudice, and to foster connections.

The Effect of Abortion Rights Political Activity on Engagement with Planned Parenthood  
Presenter(s): Emma Hazen  
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies  
Session Time: 10:15-11:30AM; Poster Number: 22  
Honors Capstone

In 2022, Roe v. Wade was overturned by the Supreme Court of the United States. Abortion became a hot topic of debate. Activists turned their attention to the issue with new vigor, and countless nonprofits became involved as well. The purpose of this study serves to explore the influence of political activity pertaining to abortion rights on Planned Parenthood. The aim is to analyze the ways that Planned Parenthood, as a national nonprofit, is affected by changes in the political sphere, which in turn generates activity via abortion activists.

This study will evaluate the extent to which abortion activity in the political sphere influences Planned Parenthood’s support through cross examination. We will look at Planned Parenthood’s history of public support through donations, volunteerism and social media engagement in comparison to dates of major political attention towards abortion rights. Major dates in this field will be determined by increases in news reporting, attention on social media and major legislation. The study seeks to answer: To what extent do changes in political activity related to abortion rights affect engagement and donations to Planned Parenthood? Based on this methodology, the study reflects on the high increases of involvement and support towards Planned Parenthood during major political events in the abortion realm. Correlations between abortion legislation and media attention demonstrate that these are, in fact, factors in attention to Planned Parenthood. Rage giving and media both contribute to the nonprofit’s success and longevity. This research project reviews the extent of success Planned Parenthood receives from increases in involvement.
**Metabolic Analysis of Hydroids through Gas Chromatography - Mass Spectrometry (GC/MS) for Proliferate Diseases**  
*Presenter(s):* Julia Hoffman  
*Faculty Mentor(s):* Victor Ryzhov, Chemistry and Biochemistry  
*Session Time:* 11:30-12:45PM; *Poster:* 94  
*Honors Capstone*

Short chain fatty acids (SCFAs) were studied in the gas phase through gas chromatography-mass spectrometry (GC/MS) as SCFAs are volatile and are often seen with derivatization and without; with advantages and disadvantages for each. Using GC/MS, SCFAs (e.g., acetic, propionic, and butyric acid) were extracted from the supernatant of hydroid colonies and quantified through calibration curves to measure the concentration of SCFAs present. Qualitative analysis was computed to identify what type of products, SCFAs, and other by-products could be elucidated by mass spectrometric analysis of the hydroid colonies subjected to various conditions.

**Don't Miss This! Effects of Mild Repetitive Traumatic Brain Injury (mrTBI) on String Pulling Behavior in Mice**  
*Presenters:* Shirley Hounnou and Citlally Rivas  
*Faculty Mentor(s):* Doug Wallace, Psychology  
*Session Time:* 11:30-12:45PM; *Poster Number:* 9

A mild repetitive Traumatic Brain Injury (mrTBI) impacts memory, cognition, and motor control. Developing a rodent model that captures this range of deficits will provide a foundation to evaluate novel therapeutic interventions. The current study examines the effects of a mrTBI protocol on the organization of mouse string pulling behavior. Fine motor control was assessed prior to mrTBI protocol (five closed head injuries each separated by 48 hours) or sham procedure (anesthesia) and several later time points. Number of contacts, double contacts, and misses were recorded for both groups during baseline and the first session after the last concussion. No significant differences were observed from either baseline or the first testing session, however, data analysis is continuing on later testing session. Future work should investigate whether the age or the sex of the mouse influences the effects of mrTBI protocol on fine motor control.

**Religious Iconography in the Southeast Asian Ceramics Trade**  
*Presenter(s):* Lillian Kennedy  
*Faculty Mentor(s):* Kanjana Thepboriruk, World Languages and Cultures/ Center for Southeast Asia  
*Session Time:* 10:15-11:30AM; *Poster:* 67

Southeast Asia is a melting pot of cultures, religions, and languages. This conglomeration of cultures can especially be seen in the ancient ceramics trade. Even now ceramics are used for everyday purposes as well as the ceremonial. Ceramics hold a special place in many cultures and Southeast Asia is no exception. Southeast Asia had a large ceramics trade with China as far back as the thirteenth century and some even earlier. Ceramic evidence is an important indicator as to how a people lived and the religion(s) they practiced. Ceramics are needed for a wide range of purposes from mundane serving dishes to boxes that are designed to hold holy relics or prayers. Trade with China created easier and more public access to ceramics. With the intense interest in Chinese ceramics, China decided to commercialize what they were offering Southeast Asia by utilizing different religious iconography in their designs. With the booming trade with other countries, foreign religions were introduced to Southeast Asia such as Christianity, Buddhism, and Islam. My research will focus on the prominent iconography of those three religions. With Christianity, the most prominent icon is the cross, with Buddhism, the swastika, and with Islam, Arabic script. My research will center around these three icons and their associated religions in an effort to track where those religions were prominent based on the ceramic evidence left behind.

**Mother Jones Monument**  
*Presenter(s):* Emma Granath  
*Faculty Mentor(s):* Rosemary Feurer, History  
*Session Time:* 10:15-11:30AM; *Poster:* 70

Here is a tour of Union Miners Cemetery in Mt. Olive Illinois. This is the location of the burial site of labor activist Mary Harris "Mother" Jones. Mother Jones was a legend of the early 20th century: a tiny
steel-blue-eyed woman who conjured courage in working-class people to take on the corporate "pirates". There was truth to this legend. Jones faced down bayonets, stared fearlessly into the eyes of the coal operators' hired guns, and defied troops sent to subdue the immigrant working class and their quest for justice. She became a legend by organizing entire communities to resist oppression. She earned many titles: The Joan of Arc of the labor movement, the "stormy petrel" who brought conflict wherever she traveled, and the "miners' angel" because she seemed to show up whenever there was a strike. She inspired people to fight, to resist, to refuse. Learn more about her here as well as the other important people buried at Union Miner's Cemetery.

Engineering a pH-Dependent Anti-Caffeine VHH Antibody Interaction Through the Introduction of Ionizable Residues Within the Homodimer Interface
Presenter(s): Peter Gungel
Faculty Mentor(s): James R. Horn, Chemistry and Biochemistry
Session Time: 10:15-11:30AM; Poster: 95

The ability of antibodies to bind selectively to antigens with a high potency allows their use as affinity reagents across a wide range of life science applications. Engineering reversible regulation of the antibody binding event expands their potential use to new applications. To evaluate the extent to which acidic residues may be used to produce pH-sensitive binding, ionizable residues were independently introduced into the interface of a homodimeric anti-caffeine VHH model system. In general, the introduction of acidic residues within the interface resulted in a pH switch where the binding affinity decreased as the pH increased from pH 4.0 to 7.4, although most acidic group substitutions resulted in significant penalties to binding at pH 4.0 (ΔΔG° > 1.5 kcal/mol), relative to the wild-type anti-caffeine VHH. Two aspartic acid variants, displaying only modest penalties to binding at pH 4.0, displayed approximately 1000- and 10-fold decreases in Kd values from pH 3.5 to 8.0. Preliminary data for a double aspartic acid variant suggests a lack of additivity in the pH response profile, most likely due to their close locations within the homodimeric interface.

Mindfulness and Child Psychological Symptoms in the Aftermath of Hurricanes Irma and Maria
Presenter(s): Ryan Hart
Faculty Mentor(s): Laura Pittman, Psychology
Session Time: 12:45-2:00PM; Poster: 29

Living through a hurricane is associated with greater levels of post-traumatic stress (PTS), internalizing, and externalizing symptoms in children (Lonigan et al., 1994; 1996; Sullivan et al., 1991). The children of St. Thomas lived through Hurricane Irma and Maria within just a two-week timeframe. Three months after these hurricanes, mindfulness was found to be negatively associated with PTS, internalizing, and externalizing symptoms (Cutright et al., 2019). Further, the positive association between perceived life threats during the hurricane and internalizing symptoms was buffered when the child reported high levels of mindfulness. While the links between hurricane exposure and psychological symptoms were associated nine months after the hurricanes, mindfulness did not moderate this link (Hart et al., 2022). Consistent with earlier findings, we hypothesized that children's PTS, internalizing, and externalizing symptoms would be positively associated with hurricane exposure and negatively associated with mindfulness fourteen months after the hurricanes. However, because of mixed findings at earlier time points, we did not predict that mindfulness would moderate the expected association between hurricane exposure and psychological symptoms.

Bifurcation Levels of the Integral Manifolds of the Newtonian N-Body Problem
Presenter(s): Hannah Havel
Faculty Mentor(s): Chris McCord, Mathematics
Session Time: 10:15-11:30AM; Poster:80
Research Rookie

The N-body problem, first proposed by Isaac Newton, is a problem in mathematics and physics that involves predicting the motion of three or more particles moving under their mutual gravitational attraction. It has importance to many areas of science, including physics and computer science, and is crucial in understanding how the universe works. In fact, it was a primary motivation for Newton's development of calculus.
An important application to the N-body problem includes how satellites behave in space using complicated orbits, which are sent out to give us television, predict the weather, and understand our solar system.

To understand the N-body problem, it is important to break it into digestible pieces. As particles move, their position and velocity change, but the values for energy and angular momentum are conserved. We can look at sets of constant energy and angular momentum, known as integral manifolds, to understand what possible motions a system can get itself into. For different levels of energy, the geometry of the integral manifold can change. There are energy levels where the geometry has an abrupt change. These are known as bifurcation energy levels. The levels where this can occur turn out to depend on the different ways that the particles can form “central configurations”. Those are configurations which retain their shape unchanged if released simultaneously from rest. The patterns of the central configurations determine the patterns of bifurcation values which can help us understand the behavior of the N-body problem under different circumstances.

Vengeance in the Eye of the Beholder: An Investigation of Perceived Bias in Situations of Revenge
Presenter(s): Kae Heroldt
Faculty Mentor(s): Randy McCarthy, Psychology
Session Time: 11:30-12:45PM; Poster: 33

Past research has shown that people who seek revenge tend to believe that the harm they caused to their aggressor is proportionate and deserved compared to those on the receiving end who find the vengeful act excessive (Stillwell et al., 2008). This asymmetry in perception may be due to the tendency for people to use introspective information to judge their own actions and biases whereas behavioral information is used to process other people’s behavior and biases (Pronin & Kugler, 2007). The present study investigated the relationship between revenge behaviors among 119 college students and their perceived levels of severity, excessiveness, and extremity (Elshout et al., 2017) of their revenge behavior compared to the inciting incident. Participants completed a Qualtrics survey through SONA where they were asked to recall a situation in which they sought revenge against someone who harmed them. Additionally, participants reported whether they feel as if their ratings are biased. The present study found that participants rate their revenge as proportional to the inciting incident, but they do not believe their evaluation is biased. Participants were also asked to evaluate the bias driving revenge of a third party in their place, which they rated as being more biased than themselves when evaluating the revenge act.

Disentangling The Axes of BDSM
Presenter(s): Sarah Holland and Glenn-Paul Nehlsen
Faculty Mentor(s): Brad Sagarin, Psychology
Session Time: 9:00-10:15AM; Poster: 37

BDSM stands for bondage and discipline, dominance and submission, sadism, and masochism, with these elements organized into a variety of axes. Top, bottom, and switch refer to roles within a BDSM scene. Dominant and submissive refer to roles within a power exchange dynamic. Leader and follower refer to roles within an authority transfer relationship. Sadist and masochist describe one’s connection to pain. Past researchers (e.g., Erickson & Sagarin, 2021; Rogak & Conner, 2018), have grouped participants under an assumption that the axes are synonymous—that all tops are dominant, for example. Our survey was designed to explore the relationships between axes, testing the degree to which the axes are or are not interchangeable.

Does Professional Registration/Licensure Include Barriers for Students with Disabilities with its Requirements?
Presenter(s): Anthony Italiano
Faculty Mentors: Megan R.M. Brown, Earth, Atmosphere and the Environment
Session Time: 10:15-11:30AM; Poster: 114
Research Rookie

Field camp is a geology course that has students go into the field and put what they have learned to the test. However, students with disabilities can struggle at field camp. Barriers can come from an inability to participate in certain activities, an inability to properly communicate their ideas, or from a faculty member not willing to assist the student. The research presented is a review of the
requirements for professional geologists' licensure in each state, whether they require field courses for registration, and how it affects students with physical and mental disabilities. The data was gathered by looking at the applications and laws in each state to see if field camp was required for licensure. The applications that were accessible online in pdf form were downloaded for later use. All of this was done by using the Association of State Boards of Geology (ASBOG) website to target the states where geologists need a license to do their job. The data show that one out of the 32 states requires field courses for professional licensure. Nine out of 32 of the states said that it is a suggested course but is not a requirement. Most students with disabilities should not have to worry about taking field camp to get a professional license.

Snailing Along: a CURE Based Approach to Teaching About Invasive Species and Dispersal
Presenter(s): Ashton Johnson and Grace Lunaburg
Faculty Mentor(s): Jennifer Koop, Biological Sciences
Session Time: 12:45-2:00PM; Poster: 105

Course-based Undergraduate Research Experiences (CUREs) allow learning that is hands-on and student-driven fostering engagement and retention of knowledge in any discipline. Here, we use this learning framework to engage students in exploring the effects of biotic and abiotic factors on animal dispersal as a means of connecting students to multiple ecological concepts. Instructors are provided with a guided lecture on key ecological concepts including the impacts of invasive species, dispersal mechanisms, and species interactions with the environment. Furthermore, the interactive lecture introduces students to the snail study system, and explains the experimental process, which involves low-cost, readily available materials (e.g., kiddie pools). Students design experiments that explore how variables including density, substrate, and temperature can affect dispersal. They conduct the experiments, engage in a process of peer-review, analyze results, and share their study. We performed this CURE in an undergraduate Ecology course and report here on student responses to the experience. The CURE is designed to be done with the fountain snail (*Bithynia tentaculata*), an invasive species throughout much of the Great Lakes region but can be easily modified to accommodate other species. The CURE is also highly amenable to modifications for variable class sizes, student grade level, and lesson time.

The Economic and Financial Effects of Bibliomania
Presenter(s): Rachael Johnson, Research Rookies
Faculty Mentor: DeeAnna Phares, Libraries
Session Time: 11:30-12:45PM; Poster: 73

I will be focusing on the financial consequences following the surge of bibliomaniacs in the early 18th century. Bibliomania is described as “a passion for the acquisition and display of books, in particular, old books” (Smith 24). The most popular books within the bibliomania community are those that contain black letter printing, illustrated copies, first editions, and those bound with silk. (Frognall Dibdin). However, those that suffered from bibliomania were not typically buying books with the intention of reading them, but rather for the sake of simply having them, or having the compulsion to collect each edition. Bibliomania impacted almost every part of the individual’s life who was suffering, especially the financial aspect. The consequences of bibliomania were as extreme as debt, the loss of homes and careers, and even led the rise of the prices of books. This is extremely important because hoarding is a huge issue in America today, with over 19 million Americans enduring it as of 2019 (Cooperman, 2019).

Why Take the Train? Why People Choose Intercity Rail as A Method of Transportation
Presenter(s): Stormy Kara
Faculty Mentor(s): Jeffery Kidder, Sociology
Session Time: 9:00-10:15AM; Poster: 23
Honors Capstone

In America, the automobile is undoubtedly the most popular form of intercity mobility, with a huge countrywide network of roads and highways, and the speed of the plane is unmatched for longer distances. However, many individuals choose to take a relatively slow, less prioritized mode of transport: the intercity train. Why do people choose to take the train over driving or flying, and how is the intercity train experience different than a road trip or plane journey? This project will combine literature review with field notes and interviews with passengers and station volunteers in northern
Illinois. Although this project is still in progress, many interesting patterns have started to form, and supports the train as a unique, viable transportation solution for many.

**Molecular detection of bacterial pathogen, Clostridium perfringens, in Bison**

**Presenter(s):** Yousuf Khan  
**Faculty Mentor(s):** Pallavi Singh, Biological Sciences  
**Session Time:** 12:45-2:00PM; **Poster:** 96  
**Honors Capstone/ McKearn Fellow**

*Clostridium perfringens* is responsible for causing approximately one million illnesses each year and is the second leading cause of bacterial foodborne illnesses. *C. perfringens* is most commonly associated with food poisoning in humans, resulting in symptoms of abdominal cramps and diarrhea. Furthermore, in rare but severe cases, *C. perfringens* can cause necrotic enteritis in humans characterized by inflammatory necrosis within the small bowel. Infection with *Clostridium perfringens* results in similar symptoms in horses, cattle, sheep, pigs, and goats. The health risk that *C. perfringens* poses to both animals and humans necessitates studies of the bacteria and the mechanisms in which it spreads. *C. perfringens* is typically transmitted via protein-rich foods that are cooled slowly after cooking and food animals are considered reservoirs of *C. perfringens*. Currently, only a few studies have conducted the detection of *C. perfringens* in animal fecal samples and none in bison. Therefore, it is important to detect the prevalence of *C. perfringens* in bison, a keystone species and an increasingly popular meat choice. Our study aims to fill these gaps in research. In our present research, we have established and standardized molecular detection of *C. perfringens* DNA control. This polymerase chain reaction will be further used for the molecular detection of *C. perfringens* in bison fecal samples. The positive DNA control and PCR will allow us to determine the prevalence of this important pathogen from bison fecal samples. This will enable us to provide valuable data to the farms and prairie restoration sites that we are sampling from. With this information, we will also begin to identify practices that lead to higher and lower prevalence of *C. perfringens*. Furthermore, it will act as a preventative measure from supplying infected meat products at a much earlier step.

**Analyzing Parent Trust as a Predictor of Parent Involvement with ADHD as a Moderator**

**Presenter(s):** Justin Ligeski  
**Faculty Mentor(s):** Julia Ogg, Psychology  
**Session Time:** 11:30-12:45PM; **Poster:** 28  
**Honors Capstone**

This study was designed to examine the relationship between parent trust and parent involvement. Higher levels of parent involvement have been shown to have positive effects on child behavior and achievement, and past studies have found significant positive correlations between levels of trust and involvement. Attention Deficit/Hyperactivity Disorder (ADHD) will be examined as a possible moderator of the association between trust and parent involvement. Extant data from a larger study involving a survey taken by parents of kindergarten students will be utilized. Regression will be used to examine the association between parent trust and parent involvement behaviors. ADHD will be included in the regression models as a moderator. Findings will contribute to understanding the association between various forms of parent involvement and how child behavior may moderate these associations.

**B The Change: Why and How B-Corporations are Entering Our Economy**

**Presenter(s):** Jessica Linley  
**Faculty Mentor(s):** Alicia Schatteman, Non-Profit and NGO Studies  
**Session Time:** 11:30-12:45PM; **Poster:** 66

This qualitative and quantitative study examines the practices of fourth-sector businesses and how they interact with and compare to our decades old three-sector economy model. Fourth-sector organizations, also called “B-Corporations” or “For-Benefits” are businesses that have made the decision to get a certification that allows them to benefit from a social cause. This certification creates a hybrid model that takes the consumer and profit aspect of a business and joins with the social change aspect of nonprofits to create a new business model in our economy. This study will focus on a well-known B-Corporation, TOMS, and how their business model and success has changed and improved since obtaining this B certification. Researchers examined the annual reports of TOMS to
determine if profits increase as a result of certification. Researchers also analyzed how much more consumers are willing to invest and interact with these hybrid corporations that help with a cause while obtaining a profit, rather than a traditional business or nonprofit.

**Does Exercise Improve Cardiovascular Health and Depressive Behaviors in an Animal Model?**
*Presenter: Jessica Linley*
*Faculty Mentor(s): Angela Grippo, Psychology*
*Session Time: 12:45-2:00 PM; Poster Number: 1*

The present study investigates the associations among stress, exercise, cardiovascular health, and depression. Social and environmental stress have negative consequences on emotion and cardiovascular function in humans. Exercise may improve mental and cardiovascular health; however, it is not clear whether exercise can protect against a combination of social and environmental stress. In this study, we used a prairie vole animal model, which is a rodent that displays several social behaviors similar to humans such as social structures and the way they respond to stress, including higher resting heart rate and helplessness behaviors. Male (n=11) and female (n=12) prairie voles were exposed to eight weeks of social isolation stress. Further, during weeks five and six, the animals (n=23) were exposed to unpredictable mild daily stressors. Subsequently, during the final two weeks of the experiment, half the animals (n=12) received an exercise wheel and the other half (n=11) remained sedentary. To investigate depressive and adaptive coping behaviors, the animals underwent a forced swim test before exercise/sedentary condition assignment and after. Upon completion of the behavioral experiments, cardiovascular recordings were conducted to evaluate heart rate and heart rhythms. It was found that exposure to physical exercise resulted in significantly decreased immobility during the forced swim test as well as significantly decreased resting heart rate compared to the sedentary group. In conclusion, our data suggests that physical exercise could promote behavioral and cardiovascular resilience to social stress and may confirm exercise treatment strategies for humans.

**Determining Presence of Salmonella in Bison in Commercial and Conservational Settings**
*Presenter(s): Samantha Mallinder*
*Faculty Mentor(s): Ritesh Ray and Pallavi Singh, Biological Sciences*
*Session Time: 9:00-10:15AM; Poster: 104*

*Salmonella* is a widespread and important zoonotic pathogen responsible for human gastrointestinal tract infections. The pathogen can colonize livestock like bison and pose a threat to both the bison and the human consumer. Further, the overprescription of antibiotics in animals and humans exerts selection pressure on Salmonella, making the pathogen resistant to these drugs. Although these pathogens have been identified in other ruminants, they have not been reported in bison yet. Therefore, our study is aimed at the detection of this foodborne pathogen in Bison. We aim to examine how the presence of *Salmonella* between commercially bred grass-fed herds and conservation herds can provide insight as to whether the diet and enclosure provided to bison put them at risk of becoming a reservoir for *Salmonella* or vice versa. This insight is valuable with an increasing human population and a growing demand for alternative meat products. Bison are becoming a more popular source of protein and with an increase in consumption, there is a higher risk of *Salmonella* infection. The detection of *Salmonella* isolates in different bison herds sampled was done using a combination of field, microbiological and molecular techniques. Field sampling was conducted using an aseptic collection of bison feces (n=15) and aliquoting followed by incubation of fecal matter in Salmonella selective enrichment media (Tetrathionate broth). The media was incubated at 37°C for 24 hours and then plated onto selective agar (Brilliant Green Agar and *Salmonella Shigella* Agar) to obtain presumptive *Salmonella* colonies. Colonies matching the manufacturer's instructions and control plate were collected and counted. Our results indicate that 13% of the animals were colonized with *Salmonella*. In future studies, the colonies will be cultured in Luria-Bertani (LB) broth and confirmed by using molecular techniques of polymerase chain reactions (PCR) using *Salmonella*-specific primers. We will further test more fecal samples from the two management settings. Overall, results will indicate that bison are an important reservoir of *Salmonella* and that measures can be adopted to circumvent the spread of this pathogen from farm to fork.
Are Graduate Students Effective at Treating Clients with Depression and Anxiety? The study of NIU Psychological Services Center

Presenter(s): Dejah Marshall
Faculty Mentor(s): Danielle Baran and Holly Kobezak, Psychology
Session Time: 9:00-10:15AM and Poster Number: 19

Psychology training clinics offer affordable mental health services to students and the general public while providing a basis for future clinicians to build clinical competence. Research examining the effectiveness of therapy delivered by trainees generally shows favorable outcomes, including the establishment of a therapeutic alliance, as well as reduced internalizing symptoms (i.e., anxiety, depression) and functional impairment. However, the majority of these studies have either focused on training clinics that integrate a variety of treatment modalities or failed to specify the treatment modality used, which leaves the unique impact of Cognitive Behavioral Therapy (CBT, i.e., one of the most widely used types of psychotherapy) in question. Furthermore, few studies have focused on the effectiveness of therapy provided by clinical psychology doctoral students. To address these limitations, the current study examined prospective changes in therapeutic alliance, internalizing symptoms, and functional impairment using a sample of clients receiving CBT at NIU’s clinical psychology training clinic. A total of 26 clients were evaluated across several time points separated by 4-week intervals. Therapeutic alliance was measured using the Working Alliance Inventory – Short Revised (WAI-SR), internalizing symptoms (i.e., depression, anxiety, stress) were measured using the Depression, Anxiety, Stress Scales (DASS), and functional impairment was assessed using the Clinical Outcomes in Routine Evaluation – Outcome Measure (CORE-OM). Repeated measures t-tests revealed significant increases in therapeutic alliance and significant decreases in depression and functional impairment. Results examining changes in anxiety and stress were not significant. CBT delivered by clinical psychology doctoral students may be particularly beneficial to those suffering from depression and experiencing functional impairment. Further research should elucidate specific mechanisms by which symptom reductions occur (e.g., stronger therapeutic alliance) as well as why it might be less effective in the treatment of anxiety.

Thrifting Your Way to the Bank: How student consumption of recycled clothing impacts financial stability

Presenter(s): Ally Mikos
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies
Session Time: 10:15-11:30AM; Poster:72
Honors Capstone

This qualitative study examines the impact that is made upon university students’ finances when purchasing recycled clothing. It analyzes how utilizing recycled, free, or reduced-price clothing sources affects student finances as compared to full price/new purchases. Previous research has indicated that two thirds of college students have acquired debt by the time of graduation, yet students have been found to spend as much as $1,000 on clothing per semester. Despite the clear financial burden of paying for college, students still prioritize shopping for clothing, which prompts the research question: To what extent does college students’ use of recycled clothing shops affect their financial stability? This study utilizes surveying as well as focus group testimonial and data provided by the Huskie Closet in order to measure the impact held by the organization and the extent to which students seek out recycled clothing. The main findings of this research highlight that students are highly likely to return to the Huskie Closet after their first purchase; this serves as evidence that recycled clothing sources offer financial relief, as individuals prioritize returning to the closet. Furthermore, utilization of the closet in the first week of the Spring Semester accounted for 23% of the total utilization of the previous Fall Semester. Based on the findings from the above data, I assert that students who utilize recycled clothing sources are more likely to save money on purchases. Therefore, they hold stronger levels of financial stability than those who exclusively shop for new clothing.
The Association Between Symptoms of ADHD, Student-Teacher Relationship, and Academic Competence
Presenter(s): Samantha Mendoza
Faculty Mentor(s): Julia Ogg, Psychology
Session Time: 10:15-11:30AM; Poster: 32

The study looked at ADHD symptoms, Student-Teacher Relationships, and academic competence. It interrogated the relationship between the symptoms of ADHD and academic competence. It focused in particular on the closeness of the student-teacher relationship asked whether the student-teacher relationship moderated the association between ADHD symptoms and academic competence.

Introducing Gender Neutral Pronouns to Second Language French Learners
Presenter(s): Ashley Montano
Faculty Mentor(s): Shannon Becker, World Languages and Cultures
Session Time: 11:30-12:45PM; Poster: 76
Research Rookie

French is a language that utilizes a binary gender system; nouns and modifiers of French vernacular are altered to conform to the agreement of the subject’s respective grammatical gender. As a result, the concept of gender neutrality is a topic of debate for members of the francophone community, as a consensus on the expression of gender neutrality has yet to be decided. In regard to the instruction of gender-neutral conventions in second-language acquisition classrooms, the pedagogy is disorganized. Educators and linguists alike have considered the issue from different perspectives and whether gender neutrality is a concept for classroom discussion at all. This study aims to analyze the current scholarly discourse around the education of French gender-neutral conventions and develop suggestions to improve current instructional methods. Upon the completion of a literary analysis and an interview with an accredited French professor, qualitative data was categorized into different tables for further analysis. The suggestions from the reviewed articles were presented in a final table alongside the suggestions proposed by the primary investigator. The resulting suggestions yielded that instruction of gender-neutral conventions and discursive strategies—strategies in which a speaker or writer avoids the usage of nouns or modifiers that require specific gender agreement—should be taught to all students. Investigators also suggested that instructors presenting the topic alongside discussions of the variance of gender expression in France throughout history may help students understand the importance of gender-neutral conventions and inspire interest in the topic as well. Finally, it is suggested that instructors search for resources to continuously educate themselves and their students about the ongoing changes regarding gender expression in the francophone community.

Response of Different Body parts of House Flies, Musca domestica, to Sucrose and Water.
Presenter(s): Merveille Muyizere
Faculty Mentor(s): Bethia King, Biological Sciences
Session Time: 11:30-12:45PM; Poster: 100
McKearn Fellow

House flies, Musca domestica, are pest insects associated with over 100 pathogens threatening humans, and animals (Khamesipour et al., 2018). Pesticides are often used in house fly control. The pesticide formulations contain sucrose as a feeding stimulant and an insecticide to kill pests. Understanding what body parts of pests must contact pesticides helps formulate a more effective bait. Insects have taste receptors on various body parts. The objective of this research was to determine whether house flies taste using their wings and leg parts including tarsi, tibia, or femur. Fly taste response was tested for the tarsi, tibia, and femur separately for the front, middle, and hind legs while removing the parts not being tested. The treatments used were 20% sucrose solution and water. When flies contact a food source appetitive to them, they put their extendible mouth out, which is known as Proboscis Extension Response (PER). Whether flies displayed PER or not upon contact with treatments was recorded. 40 replicates were done. Leg parts that showed a statistically significant PER for sucrose compared to water were the tarsi of the front and middle legs for males and females, the tibia and femur of the front legs of females, and the femur of the middle legs of males. In testing flies for taste in wings, a house fly was placed in a small petri dish where their anterior wing margin was touched by a stick dipped in either 20% sucrose solution or water. Whether flies show PER was observed, and fly grooming behavior for 3 minutes was recorded. Thirty
replicates were done. There was no statistically significant difference in PER or grooming for wing response to sucrose vs water. Therefore, baits relying on flies eating sucrose should primarily try to place the bait where the flies’ front and middle tarsi will make contact.

**Champions for Actionable Restoration of Ecosystems**

*Presenter(s): Em Myers and Christiana Guthrie*

*Faculty Mentor(s): Colin Kuehl, Political Science*

*Session Time: 9:00-10:15AM; Poster: 115*

As disciplines on their own, Biology, Political Science, Communication, as well as Design and Illustration can offer us a variety of tools and methods to approach conveying information about the environment and its adjacent issues and challenges. A biological perspective offers solutions like conservation and restoration to combat timely environmental crises like biodiversity loss and climate change. A political science perspective enables political action that can result in substantial changes in the laws and acts that can protect the environment and all who depend on it to survive. A communications perspective provides the means to effectively relay the science behind environmental problems in a way that all people can understand. And lastly, a design and illustration perspective can manifest the inspiration needed to convince an audience to care about environmental problems. In the hope of creating synergistic environmental solutions that utilize the tools and methods each of the four of these perspectives individually present, experts from each of these disciplines can work together.

This collaborative setting is commonly called a transdisciplinary approach, and we’ve created what we call “The Silo Model” to illustrate the outcomes of using this approach. For example, effectively restoring prairie ecosystems at scale requires the political will for behavior change that is spurred by effective communication and strong visual and narrative storytelling. Our group seeks to break down disciplinary silos to create synergistic outcomes for restoring Illinois prairie ecosystems. Our project seeks to eventually empirically test the ability to change people’s attitudes and behaviors towards the environment. For now, experts from each of the described disciplines, as well as a few undergraduates, have been working together to better understand the nuances of each other’s backgrounds and specialties. The desired outcome of these efforts is a survey that will be administered to college students to measure the impact of restoration storytelling on their environmental attitudes and behaviors.

**Modeling the Structure of Highly-concentrated “water in salt solutions” for use of Electrolytes in Lithium-Ion Batteries**

*Presenter(s): Emanuel Naumann*

*Faculty Mentor(s): Ralph Wheeler, Chemistry and Biochemistry*

*Session Time: 12:45-2:00PM; Poster:103*

**Research Rookie**

Improving the safety and efficiency of lithium-ion batteries would have a major impact on energy storage, as lithium-ion batteries are used in a variety of portable electronics and are a key factor for producing electric cars. Water in salt solutions see potential use in lithium-ion batteries; when applied, these solutions replace flammable battery components, which would make batteries safer by lowering the risks of explosion. In order to allow for more potential applications to be utilized commercially, better understanding the structures of water in salt solutions is needed. Molecular dynamics computer simulations for water in LiFSI (lithium bis(fluorosulfonyl)imide) were used to help interpret small-angle x-ray scattering (SAXS) experiments. Fitting a Lorentzian function to peaks in computed and measured structure factors allows predictions of distances between FSI ions in LiFSI and sizes of polar aggregates.

**Age Differences in Object Attachment and Collecting**

*Presenter: Marshall Noelken*

*Faculty Mentor(s): DeeAnna Phares, Libraries*

*Session Time: 12:45-2:00PM; Poster Number:5*

**Research Rookie**

Collecting, distinct from hoarding disorder, is a relatively common and harmless hobby that can be observed in people of varying ages. However, the motives for and benefits of collecting and object attachment differ throughout the lifespan; while children collect stones and leaves to understand their environment and hone critical thinking skills, older adults hold onto photographs and gifts from loved ones.
ones to maintain a sense of identity and to maintain social ties across time and space. This literature review seeks to compare and contrast collections and their educational and therapeutic benefits across the lifespan.

**Food or Fungus: An Examination of House Fly Response to Different Concentrations of a Fungal Biopesticide**
*Presenter(s): Amarachi Nwawueze  
Faculty Mentor(s): Bethia King, Biological Sciences  
Session Time: 9:00-10:15AM; Poster: 106*

House flies are pests tightly associated with decaying organic matter (e.g., rotting food, manure) in both agricultural and urban settings. House flies are nuisances in homes and farms and can even contribute to the spread of disease-causing bacteria. House fly populations are controlled by sanitation measures, but when sanitation measures do not provide adequate control of fly populations, pesticides are often used. Repeated use of the same control method can lead flies to evolve resistance to that control. Pesticides can also harm non-targeted organisms (e.g., pollinators, plants). Alternative control methods, such as biopesticides, are suggested as targeted methods to control house fly populations. This study examines the suitability of Botanigard ES, a fungal biopesticide currently used against insect crop-pests but being considered as a component in a sugar bait against house flies. A series of choice experiments were completed using a pesticide-susceptible strain and a wild-type strain of house flies to determine if house flies will stay as long on sugar cubes containing low, medium, and high amounts of Botanigard ES compared to a control sugar cube. House flies were provided water only after emerging as adults and then placed in a choice arena with a control cube and a fungal cube for 5 minutes. Their duration on each sugar cube was determined; the difference in time spent on the fungal sugar cube minus on the control did not statistically differ regardless of fungal concentration and house fly strain.

**Attendance and Learning Metrics in PHYS 273**
*Presenter(s): Will Parker  
Faculty Mentor(s): Michael Laurence Lurio, Physics  
Session Time: 11:30-12:45PM Poster: 120*

PHYS 273: Fundamentals of Physics II is the second-course in the three-course sequence of calculus-based general physics offered by NIU. Almost exclusively taken by majors in chemistry, engineering, meteorology, and physics, students are exposed to active learning by incorporating problem-solving group exercises in the lectures. These exercises are facilitated by the instructor and the learning assistants, which are students who have previously taken and excelled in the course. To further corroborate the recent trends indicating that active learning yields better student outcomes, attendance is being tracked for students enrolled in the Spring 2023 offering of PHYS 273. The rate of attendance for each student will then be compared, at the end of the semester, to student outcomes in exam scores, final course grades, and concept inventory scores.

**Should Academia Thrive for Research Citation in Policy? A Case Study on Five Universities in Illinois?**
*Presenter(s): Minhaz Patel  
Faculty Mentor(s): Dr. Hamed Alhoori, Computer Science  
Session Time: 12:45-2:00 PM; Poster: 122*

Academics and policymakers are seen as operating separately, which limits the potential impact of research on society. Although universities are conducting cutting-edge research in multiple fields, the impact of their research on policy documents is often underrepresented. Therefore, it is imperative to unveil the contribution of academic research for evidence-based policymaking that is encouraged in all public service areas. The research aims to conduct an in-depth exploratory data analysis and statistical summarization to comprehend the extent of academic research within policy documents.
Evaluating a Potential Method for Mitigating Gender Bias in Student Evaluations of Teaching in a Biological Sciences Department
Presenter(s): Marissa Pezdek
Faculty Mentor(s): Heather Bergan-Roller, Biological Sciences
Session Time: 11:30-12:45PM; Poster: 89

Student evaluations of teaching (SETs) are used to gauge job performance but have been found to be biased against women. Since SETs are an important part of interpreting an instructor's teaching, being able to address and mitigate bias is vital to ensuring instructors are accurately and fairly assessed. A study completed in 2019 claims to have mitigated gender bias in both an American politics course and an introductory biology course. The study applied an “anti-bias statement” to the SETs meant to remind students of potential implicit biases which may affect their ratings of professors. Their previous study concluded that the anti-bias statement mitigated gender bias. The current study aims to replicate this experiment to determine if the anti-bias treatment can be successful in mitigating gender bias when applied across a Department of Biological Sciences. Students were randomly assigned to either receive the anti-bias statement or not when filling out online SETs for courses offered by one Department of Biological Sciences during Spring 2021, Fall 2021, and Spring 2022. Complete student responses (n = 827) were evaluated quantitatively using multiple regression considering the predictor variables of treatment and instructor gender for three response variables: Overall Average, "My overall rating of the course is:'", "My overall rating of the instructor is:'". Quantitative analysis revealed that the anti-bias treatment had minimal impact on students' closed-response SETs. The gender of the instructor had some, but limited, impact on students' closed-response SETs. When there was an effect of gender, women instructors had higher scores then men instructors. Therefore, gender bias is a more complex problem and was not solved with a simple intervention. This demonstrates a need for more research into the nuances of gender bias in SETs and how to better evaluate teaching that is more reflective of teaching and has fewer biases.

The Impact of COVID-19 on Northern Illinois University Students
Presenter(s): Courtney Pitstick
Faculty Mentor(s): Laura Heidman, Sociology & Center for Non-Profit and NGO Studies
Session Time: 10:15-11:30AM; Poster Number: 16

With the emergence of the COVID-19 pandemic, the world saw unprecedented changes to the way we lived, worked, and learned. Workplaces and schools went from offices and classrooms to living rooms and bedrooms. While these numerous changes aimed to keep ourselves and others safe, they brought with them their own source of problems. These problems are ones that need to be further explored in order to improve upon their practices. This is especially true among college students. Thus, this study aims to identify issues that current Northern Illinois University students faced during their college studies amid the COVID-19 pandemic and steps that can be taken to improve upon policies and practices set into place during that time period and beyond. For this research, ten current Northern Illinois University students were asked a series of questions regarding their academic experiences from Spring 2020 to Spring 2021. These questions explored arenas such as mental health, disruptions in learning, technology failures, and preparedness of faculty and staff. Through this study, I found that one of the largest problems students experienced was technological issues, such as internet connections and learning platforms. Along with technology issues, students felt like a lack of engagement among their classroom hindered their learning. At the same time, a majority of the students felt like they had little to no support with obtaining or receiving mental health care. With these issues in mind, students were able to provide ideas for the improvement in the experience of unconventional learning such as increased mental health support and a greater push for students to have experiences with different learning techniques. It is with these changes, that we can provide a students with a quality learning experience no matter the situation.
REFUGE: A United Front Against Domestic Violence  
Presenter(s): Kaitlyn Pitt and Jade King  
Faculty Mentor(s): Patty Wallace, Psychology  
Session Time: 12:45-2:00PM Poster Number: 20  
Honors Capstone

Our spouses, guardians, siblings, children, friends, and partners surround us, support us, and protect us. However, for millions of people every year, these close relationships have turned violent and abusive. Despite the prevalence of this issue, domestic violence is often an underfunded and misunderstood field that continues to struggle to get much-needed attention. We sought to remedy this lack of attention by delivering a fresh and modern format for sharing critical information and educating about domestic violence that would reach a variety of audiences. We formatted this information into a six-episode podcast named REFUGE: A United Front Against Domestic Violence, in which we are the hosts, guiding the audience through different topics related to domestic violence. In each of the six episodes, we explore a specific theme, which includes Recognize, Experience, Facts and Figures, Unite, Goals, and Encourage. To showcase each of these themes, we were joined by eleven hand-picked interviewees, all of whom are hardworking professionals in the field and members of the community that have been involved in domestic violence. With carefully crafted interviews, we were able to display each of our professionals’ expertise while diving into the cycle of abuse and violence that has plagued society for centuries. Through these deep dives, we uncovered helpful and feasible solutions to end violence in our world. Education, community, and personal accountability, by each and every one of us, is the way we can start putting an end to domestic violence and teach future generations how to break the cycle.

Agreeableness on the Reception of Insincere and Sincere Apologies  
Presenter(s): Daniela Quiroga  
Faculty Mentor(s): Randy McCarthy, Psychology  
Session Time: 9:00-10:15AM; Poster: 31

Apologies are often given after a transgression has occurred but the person who receives the apology has to decide if the apology is sincere, and whether or not to accept it. This places various factors into consideration for the individual after the transgression. Often researchers look into trait agreeableness in order to help predict behaviors. Dispositional narcissism, guilt, and empathy have been found to be correlated with willingness/unwillingness to apologize. (Leeunissen et al., 2018) Building on prior research, the present study focused on trait agreeableness and apologies. We hypothesized that persons higher in trait agreeableness would tend to accept more insincere apologies and reject less insincere apologies. A vignette study and randomly assigned questions were employed in the experiment. Participants were to read the vignette and respond as if they were in the scenario. Afterwards this prompted questions regarding rejecting or accepting the apology given. The findings assist in expanding our current understanding of the connections within trait agreeableness and apologies.

Municipal Madness: An Analysis of Metropolitan Industrialization in British Burma 1870-1920  
Presenter(s): Cameron Racelis  
Faculty Mentor(s): Trude Jacobsen Gidaszewski, History/Center for Southeast Asia  
Session Time: 10:15-11:30; Poster: 60

Rangoon (Yangon) in British Burma proliferated in the 19th century from a small village to a central commercial hub in the Indian Ocean trade network. However, existing scholarship has primarily focused on the Anglo-Burman Wars of the time, neglecting the role of the multicultural, non-governmental community already present in Lower Burma. This research project aims to address this gap in knowledge by examining how the British Indian government utilized existing communities of Persian, Armenian, Chinese, Indian, and European entrepreneurs in developing the town through the Rangoon Municipal Committee. The research methodology employed archival research by examining newspapers and gazettes through microfiche reels and database mediums. The study used 40 microfiche reels of the British Burma Gazette borrowed from the Center for Research Libraries, 31 microfiche reels of the Rangoon Times on loan from Cornell University, and at least 50 reels of the Rangoon Gazette from 1887 to 1920 in Founders Library. Supplements, ordinances, and council
meetings all provided primary sources for analysis. Sections pertaining to asylums, hotels, and commercial districts were analyzed to uncover further findings about the development of the colonial port city. For example, the Municipal Committee's decision to close a bazaar (market) in 1879 was based on concerns about the rapid spread of epidemics among sellers, purchasers, and their families. This research provides a more in-depth analysis of the social functions of the Rangoon Municipality within the British colonial administrative system. By researching the previously neglected role of multicultural, non-governmental communities, this study sheds light on the unforeseen developments of Rangoon in the 19th century, and how these communities operated within a system of metropolitan industrialization.

A Study of Program Outcomes and Community Needs  
Presenter(s): Isabella Ramirez  
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies  
Session Time: 9:00-10:15AM; Poster Number: 14

The purpose of this research paper is to look at the effectiveness of programs that are funded by the organization INC Mental Health Alliance (INCMHA). INCMHA-funded agencies provide services to seven townships of Aurora, Batavia, Big Rock, Blackberry, Kaneville, Sugar Grove, and Virgil. Part of their goal is to provide mental, intellectual, and developmental health free of charge or at a reduced rate to provide a system of care to the members of these townships. This study seeks to explore one of INCMHA's funded agencies and determine, based on their outcome data, if their services reflect the needs of their communities.

The Post-Graduate Experiences of NNGO Majors, Minors, and Certificates  
Presenter(s): Dasha Denia Randle  
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies  
Session Time: 11:30-12:45PM; Poster: 26

This capstone is a case study on graduates from Northern Illinois University who majored, minored, or received a certificate in Nonprofit and NGO studies. This qualitative and quantitative study will be a comparison between the post-graduate experiences of graduates who interned via the Center for Nonprofit and NGO studies and those who didn’t. Prior research suggests that paid internships generally have a positive correlation with entry-level career success. However, there is not much research in the social sector. I’m interested in seeing how nonprofit interns fare in the workforce, and if they have an advantage over students who do not intern. I will utilize data gathered from a survey I created, which was administered by Dr. Alicia Schatteman to all graduates of Nonprofits and NGO studies. This data will be used to answer my research question, “To what extent does interning via the Center for Nonprofit and NGO studies affect the employment of graduates?”. The results of this study could give insight to the Center for Nonprofit and NGO Studies on how they could improve the internship experience and impact. It could also enlighten more students on the significance of internships via the Center for Nonprofits and NGO studies, and why they should participate in them.

Nonprofit Employee Work Engagement: A Ripple Effect Impacting Communities  
Presenter(s): Isabel Raymundo  
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies  
Session Time: 11:30-12:45PM; Poster: 24

The nonprofit sector is experiencing a growth in professionalization, and as such it is important to pay attention to keeping employees engaged at work to be able to compete in a competitive job market. As most nonprofit employees do direct service work, keeping employees engaged should be a primary focus since the sector is known for burnout. Not only is work engagement essential for employee retention, but due to the intensity of the work to meet the mission of the organization, keeping employees engaged is better for the overall health of the organization. If employees are engaged in their work, then they will be actively engaging the community, which is another primary focus of nonprofits. Previous nonprofit research has primarily focused on employee work engagement or community engagement. Therefore, this case study bridged the gap and researched to what extent employee work engagement is related to
an organization’s community engagement within a nonprofit. This study used the Utrecht work engagement scale to measure work engagement, and in addition to this, community engagement was measured using interviews and by analyzing the organization’s website and Facebook. For the purpose of this case study, the mental health nonprofit organization Family Counseling Services of Northern Illinois located in Rockford, Illinois was used. The size of the organization is considered small, they employ 6 administrative staff, and 17 clinicians. The results of this study could contribute to knowledge within the nonprofit sector and could lead to more focus on working conditions for nonprofit employees in what is considered a high burnout career doing direct service with communities.

**Climate Change’s Effect on the Insurance Industry**
*Presenter(s): Helen Rohn*
*Faculty Mentor(s): Alan Polansky, Statistics and Actuarial Sciences*
*Session Time: 12:45-2:00PM; Poster: 78*
*Honors Capstone*

Climate change has a large number of negative effects. Some of these effects can be costly. Insurance agencies are responsible for the health and injuries of their insured. They also are liable for property damage due to events such as floods and natural disasters. With climate change having a costly impact, actuaries need to develop methods for predicting the effects of climate change to improve the underwriting process and avoid losing money. I researched the topic by looking at sources specifically created for actuaries. The Society of Actuary and a variety of databases provided the information shared in this project. Actuaries can analyze potential costs due to climate change through a number of methods. Some ways to predict high levels of loss include examining micro correlations and including fat tails in analyses. Micro correlations may seem small, but there can be large unaccounted for costs when they are not included in analyses. These can include extreme weather in one part of the globe being connected to weather in another part. This can make models more accurate in their risk assessment by including more data. Additionally, fat tails can also help to prevent underfunding. Fat tails make the more extreme results more likely in modeling. With more extreme events becoming more common with global warming, it can help prevent underestimation. Insurance companies can account for these costs in multiple ways. They can increase premiums based on new risk levels. Additionally, they can invest in more eco-friendly companies that are less likely to be hurt by climate change. They likely will need to set up additional reserves and hedge funds to ensure they will have the funds to cover claims. A combination of these can ensure the survival of a company in the face of a natural disaster.

**The Effects of Population Density on Dispersal in Invasive Aquatic Faucet Snails**
*Presenter(s): Jacob Sachs and Ben Lunaburg*
*Faculty Mentor(s): Jennifer Koop, Biological Sciences*
*Session Time: 12:45-2:00PM; Poster: 88*

Faucet Snails (*Bithynia tentaculata*) are an invasive species of freshwater snail that arrived from Europe in the 19th century. Since then, they have spread across the Great Lakes region and across the Mississippi River, where they compete with native snails. The primary concern with the spread of Faucet Snails is their impact as an intermediate host of parasites on waterfowl that travel over the infested pools. Faucet snails are the intermediate host for several species of flukes and trematodes that complete their reproductive cycle in the digestive systems of waterfowl that eat infested snails. The parasites burrow into the digestive tract of the waterfowl and release their eggs with the bird’s feces. This process often causes massive and fatal hemorrhaging in the waterfowl and is responsible for large population die-off events during migration. Understanding factors that influence the dispersal of faucet snails can lead to better protection for uninfected areas and prevent parasitic infection in more migratory birds. Ten adult snails were marked with paint on their shells to indicate focal snails and separated into two groups of differing population density: N=10 and N=100. Six pools were set up, each with uniform dimensions. All focal snails were placed in contact with a weighted marker at the center of the pool, followed by a thirty-minute recovery window and a two-hour trial time; the linear distance between the focal snails and the center marker was recorded to the nearest millimeter. Results indicated that population density was not the driving factor for dispersal in different populations of snails, but tests indicated that there was another factor responsible for the differences in average movement across groups.
To the Left, to the Left: Effects of Repeated mrTBI on the Organization of Open Field Behaviors

Presenter(s): Cynthia San Martin Urbina and Julia Bogunia  
Faculty Mentor(s): Doug Wallace, Psychology  
Session Time: 11:30-12:45PM; Poster Number: 7

Traumatic brain injury can lead to a decreased quality of life due to a range of behavioral deficits. From previous studies it has been observed that rodent models of mild repetitive traumatic brain injury (mrTBI) have implicated vestibular damage in performance deficits. Such vestibular deficits have been observed to contribute to disruption in organization of open field behaviors. The current study evaluated the effects of mrTBI on the organization of open field behavior. Adult male mice (rTBI n=10; Sham n=9) were individually place on a circular table for 30 minutes under complete dark conditions. Motion tracking software (Noldus) was used to capture mouse position over four five-minute samples and resulting coordinates were used to derive kinematic and topographic measures of movement. Results indicate the mrTBI mice exhibited a lateralization of turns, favoring the right, as well as an increase in the magnitude of changes in heading. Future research should continue to assess the organization of open field behaviors to evaluate new treatments to reduce the impact of mrTBI on disorientation.

How Changes in Women’s Film Representations Reflect Changes in Society and Feminism: The Case of Modern WWII Spy Film and Modern Feminism

Presenter(s): Anna Scanlan  
Faculty Mentor(s): Brian Sandberg, History  
Session Time: 11:30-12:45PM; Poster: 68  
Honors Capstone

World War II espionage thrillers have been around since the war itself and films continue to be made depicting this historical era. Although WWII spy and intelligence films can be considered their own genre, they arguably still fall under the larger umbrella of WWII films in general. Consequently, tropes and themes within a larger body of WWII films often carry over into the subgenre, including gender-related tropes and themes. In recent years, espionage films have tried to break female characters out of stock typologies, two notable examples being Female Agents (2008) and A Call to Spy (2019). These films succeed in reimagining a number of tropes, but many underlying themes related to women maintain conventional gender stereotypes. My research examines Female Agents, Black Book (2006), Enigma (2001), A Call to Spy, Allied (2016) and The Imitation Game (2014) in the context of a broader body of WWII espionage films to analyze changing gender representations and stereotypes in contemporary historical film. This study examines contradictions in the messaging of these films across a broad range of sources, such as the films, their scripts, interviews with various creators, and directors’ notes. Their visual elements will be closely analyzed considering historic and cinematic citations, that is, references to key historic and cinematic images. I will analyze the films’ representations of historical contexts and popular culture; additionally, modern feminist movements and theory will help guide examination of the films’ executions and productions. A potential fourth wave of feminism began in the middle of this influx of WWII espionage film production, allowing for a consideration of filmmakers’ motives and audience’s perspectives at two distinct points in contemporary history. Overall, this study aims to detect patterns and contradictions in WWII espionage film’s portrayals of women, gender, and cultural constructs in relation to modern feminism.

Love Kids, Hate Cancer? If that is not reason enough... A study on donor and volunteer motivation.

Presenter(s): Rachel Schreiber  
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies  
Session Time: 11:30-12:45PM; Poster:71

The purpose of this study is to explore the relationship between the non-profit organization Camp Kesem National and their donors, who are primarily friends and family members of the college students involved. This study seeks to answer the question, to what extent of Kesem's one-time donors become repeat
donors, and for how long are these donations recurring? The goal of this study is to analyze data from Kesem chapters, while considering both donor motivation and volunteer motivation to increase donor relationships in the past four years. Within the last two years, Camp Kesem at Northern Illinois University has reestablished relationships with over 350 lapsed donors. These are individuals who donated once or twice but have not donated within the last fiscal year or two. Many of these lapsed donors are the friends and family members of previous counselors and student leaders. Of the donors who had not contributed a gift since Giving Tuesday in 2019, 8% were family members of seniors who graduated that spring. Through a survey, interviews, and case studies, the findings indicate that Camp Kesem can continue to be successful with an annual turnover of donors.

**Chicago Transit Authority Data Analysis - Visualization**
*Presenter(s): Michael Sensenbrenner*
*Faculty Mentor(s): David Koop, Computer Science*
*Session Time: 12:45-2:00PM; Poster:79 Research Rookie*

The availability of timely and consistent public transit information is crucial for many individuals traveling from one place to another. In Chicago, the Chicago Transit Authority (CTA) offers various transportation options, including the “L” rapid transit system. The CTA provides train schedules and a real-time train tracker for the “L,” allowing riders to plan their trips by estimating the time it will take for a train to arrive at a specific stop. Our study involved analyzing this data to determine the trip duration and evaluate the accuracy of the predictions. By identifying inaccuracies and analyzing the data, we aim to contribute to the development of a more efficient, reliable, and user-friendly transit system that caters to the needs of both commuters and visitors in Chicago.

**Landslide Forecast in Taiwan Based on Machine Learning in the GIS Field**
*Presenter(s): Yi Shen*
*Faculty Mentor(s): Wei Lou, Earth, Atmosphere and Environment*
*Time Session: 11:30-12:45PM; Poster:116 Honors Capstone*

Landslides can pose a significant risk to life, property, and infrastructure in mountainous regions, and can be triggered by various factors, including intense rainfall, earthquakes, and water level changes. Machine learning is commonly used to forecast landslides, based on statistical relationships between past landslides and multiple variables to create a general forecasting model. However, these models often require large amounts of data to achieve accurate results. This project aims to use only a few variables but take advantage of both considering their spatial distribution and temporal trends to improve the accuracy of landslide forecasts. This approach is tested in Taiwan, a region prone to landslides, and could be beneficial for pre-planning and early warning systems in areas with limited data to mitigate landslide risks.

**Hacking Cancer Cell Metabolism**
*Presenter(s): Laurita Uribe Aristizabal*
*Faculty Mentor(s): Linda S. Yasui, Biological Sciences*
*Session Time: 12:45-2:00PM; Poster:98 Research Rookie*

This research project is focused on studying how autophagy can be targeted to sensitize cancer cells to radiation therapy, particularly between the vesicle elongation and vesicle fusion steps. Autophagy is a normal cellular process in which cells can remove and recycle old and damaged cellular components and maintain the cell’s overall health. The process of autophagy, mediated by small vesicular structures in a cell called autophagosomes, is a dynamic process. Autophagosomes must relocate to lysosomes for the completion of the process. However, knowledge of the autophagosome relocation process is scarce. In fact, a gap in knowledge exists regarding the effects of radiation on the relocation of autophagosomes in cancer cells. To better understand how autophagy can be targeted to improve radiation therapy, the movement and distribution of autophagosomes in irradiated cells is compared to unirradiated brain cancer cells, using super-resolution confocal microscopy, in combination with time-lapse imaging of live cells. We
hypothesize that radiation adversely impacts the relocation of autophagosomes in irradiated cancer cells. In tracking these movements, treatments can home in on finding the best moment to "hack" the cell to create the greatest amount of lethal damage inside the cancer cells.

**Anatomy & Physiology Students' Knowledge and Perceptions of Learning Sexual Health and Pleasure**

*Presenter(s): Yaileen Velazquez*

*Faculty Mentor(s): Heather Bergan-Roller, Biological Sciences*

*Session Time: 10:15-11:30AM; Poster Number: 12*

*McKearn Fellow*

The purpose of this research is to understand Anatomy & Physiology (A&P) student’s knowledge and perceptions of learning about sexual health and sexual pleasure. Investigating the understanding of this will entail analyzing surveys on students’ knowledge of sexual health and their perceptions of learning about sexual health in both class settings and out of class settings. The surveys will also allow us to compare student growth in the subject from the start of the semester to the end of the semester of their A&P classes. So far in the project, we have fully analyzed the question stating, "where would you say you learned the information you used to answer the previous question about sexual pleasure?" The overall purpose of this project is to include sexual pleasure in A&P context. By adding this context in A&P it will cause science to be significantly more inclusive. Especially when using sexual pleasure and the associated anatomy and physiology to represent a true variation of people, not just androcentric and heteronormative people but also LGBTQ+ communities, experiences, and bodies ought to be included. It is important to realize that by including a truer variation, science communities will gain valuable perspectives, acceptance, and it will provoke new thinking.

**A Kinesin-like Protein Encoded by CG14535 Controls Border Cell Migration During Drosophila Oogenesis**

*Presenter(s): Leif Verace*

*Faculty Mentor(s): Oliver Devergne, Biological Sciences*

*Session Time: 11:30-12:45PM; Poster: 97*

*Honors Capstone/ McKearn Fellow*

Cell migration plays a key role in many biological processes including embryonic development, tissue morphogenesis, and wound healing. Cell migration is also involved in metastasis, a hallmark property of cancer cells. Thus, understanding how this behavior works is highly important. To study cell migration, we utilize the process of border cell (BC) migration in *Drosophila melanogaster*. This sees a cluster of cells migrate across a multicellular structure known as the egg chamber during oogenesis. In a genetic screen, we identified a mutant KC53 which results in BC migration defects. This allele was mapped to a kinesin-like gene, CG14535, on chromosome 2L. I will describe the various approaches and preliminary results we have obtained to investigate the role of CG14535 in the control of BC migration. These include mutant clonal analysis, RNAi knockdowns, and generation of a novel CG14535 mutant using the CRISPR/Cas-9 genome editing system.

**Emerging Adult Conversations with Parents**

*Presenter(s): McKenna Vertiz*

*Faculty Mentor(s): Mary Lynn Henningsen, Communication*

*Session Time: 9:00-10:15AM; Poster Number: 8*

Emerging adulthood is an important stage in the relationship between young adults and their parents. In this stage, young adults start to evaluate the world for themselves, and they make decisions that serve as the foundation for future behaviors and future relationships. Parents of emerging adults communicate with their children in different ways than they do with children of other ages. In this stage, parents may need to rely on advice rather than more direct forms of influence. When parents communicate their advice to their children, however, that communication might not be received as if it is advice. The study investigated repeated parental advice that emerging adult children receive from their parents. The study asked participants open-ended questions about a conversation with a parent. Respondents were asked how
they felt after the conversation had occurred, as well what they thought was the parents’ goals in the
conversation. Many felt that they were given unsolicited advice or that the parents were nagging them.

The Physiology of Proliferation Using Hydroid Models
Presenter(s): Kaiden Vinavich
Faculty Mentor(s): Neil Blackstone, Biological Sciences
Session Time: 9:00-10:15AM; Poster: 93

This research project aims to study common metabolic characteristics associated with cancer in the
context of the marine hydroid species, Eirene sp. Eirene sp. works well as a model cancer organism
because of its mitotic, rapid, and long-lasting polyp proliferation stage. The proliferation of Eirene sp. may
be regulated through nutrient manipulation. This research will provide insight into how nutrient
manipulation affects the development of cancer-associated metabolic traits, such as decreased oxygen
uptake and increased reactive oxygen species (ROS), in mitotically replicating cells. Nutrient-abundant
and nutrient-scarce colonies were grown simultaneously to determine how the amount of feeding affects
these response variables. The nutrient-abundant colonies are fed three times a week, whereas the NS
colonies are fed only once a week. The colonies were grown on coverslips submerged in finger bowls and
maintained at 20.5°C. The colonies were re-explanted to new coverslips to them under continual growth.
The re-explant and replication rate of the treatment colonies measured at the end of each month. Oxygen
uptake was measured using a Strathkelvin 1302 electrode and 781 oxygen meter. ROS production was
measured through a H2DCFDA ROS assay. The nutrient-abundant colonies had a higher replication rate,
higher reactive oxygen measures, and lower oxygen uptake measures than the nutrient-scarce colonies.
The nutrient-abundant colonies’ metabolism parallels that of cancer cells.

Investigating the variance of distances from an interior point to the edges of a triangle
Presenter(s): Joseph Wasiqi
Faculty Mentor(s): Alastair Fletcher, Mathematics
Session Time: 12:45-2:00PM; Poster: 77
Research Rookies

This research project examines the relationship between the variance of the distances from a point inside
a triangle to the edges. Using this measurement, an imaging algorithm attempts to classify a cell as being
inside or outside of a clump of tissue, based on how the variance of distances differs between cells. The
main assumption of the authors of the algorithm, is that the variance of distances is inversely related to
the location of a point to the edge. To test this assumption, a general-purpose algorithm was created to
find the variance of distances for polygons. It is shown that the assumption holds for equilateral and
isosceles triangles but does not necessarily hold for scalene triangles. This demonstrates that while the
authors’ algorithm may produce relatively good results, their assumption is flawed and demonstrates the
need for further research.

Improving Evidence and Reasoning in Argumentation through Instructional Scaffolding
Presenter: Hannah Welsch
Faculty Mentor(s): Anne Britt, Psychology
Session Time: 9:00-10:15AM; Poster Number: 4

One common challenge for students in many disciplines is learning how to write coherent culminating
argumentative essays. To do this successfully, students must gather evidence across several sub-
activities, use reasoning to connect the evidence to the claim, and understand the role of explanations in
argumentation (Osbourne et al., 2001). Recently researchers have proposed the implementation of
investigation steps and causal models to help structure evidence to guide students in formulating
scientific argumentation (Easley et al., 2022). These tools are intended to help students understand the
goals and strategies when writing scientific arguments (Britt et al., 2018). The current study tested the
utility of these two scaffolds as supports for students’ scientific argumentative essays. The investigation
steps are displayed as a set of 5 questions for each sub-activity to guide their research (e.g., the
question, the materials, how the materials will be used, what was found, and what still needs to be
addressed). The causal model is a graphical tool to help students identify the important factors in a
system and how those factors affect each other. This should then guide the collection of evidence and reasoning as well as the selection of the best supported claim. Both the experimental group and the control condition used readings and 2 simulations using actual data to answer the question: “Which two limiting factors best explain the changes in the coquí population following hurricane Hugo?”. It is hypothesized that participants who received the investigation steps and causal models will include the most important evidence and key concepts in their argumentative essays. The data collected is currently being coded and analyzed.

The Role of the osaA Gene in Aspergillus fumigatus Development
Presenter(s): Emma Whitlock
Faculty Mentor(s): Ana Calvo, Biological Sciences
Session Time: 9:00-10:15AM; Poster: 90
McKearn Fellow

The filamentous fungus Aspergillus fumigatus is an important saprophytic, airborne, and opportunistic human pathogen. It causes respiratory aspergillosis, which is one of the leading causes of deaths among individuals affected by fungal infections worldwide, particularly in immunocompromised population groups. The pathogenicity of the fungus is attributed to its virulence factors such as thermotolerance and effective germination rate at 37°C (human body temperature). The small size of A. fumigatus spores (2-3 \( \mu \)m) allows them to easily enter the human respiratory tract. Once inside the host, the spores germinate to form mycelial mass. Several virulence factors such as cell wall adhesins and hydrolytic enzymes degrade the protective membrane of immune host cells. Additionally, A. fumigatus produces secondary metabolites which are proven to be highly cytotoxic to the human system. Nowadays, the number of immunocompromised individuals affected by aspergillosis is on the rise. At the same time, resistance to current antifungal treatments is occurring, therefore, it is paramount to find new treatments. Our study investigates possible new genetic targets against A. fumigatus infections. In the phylogenetically close model organism, Aspergillus nidulans, the osaA gene was identified to orchestrate both asexual and sexual development, suppressing the formation of fruiting bodies and promoting conidiation. Our research focuses on investigating the role of osaA in development, toxin production, and virulence of A. fumigatus. Our results revealed that osaA has an important role in fungal growth and conidiation in this fungus. Deletion or overexpression of the osaA gene showed significant phenotypic changes in its colony morphology and reduced conidial production, generating abnormal conidiophores in the absence of osaA.

Only 2000 PSI of Bottom-Time Air: A Case Study of Diveheart Participant Social Capital
Presenter(s): Kirk Williams
Faculty Mentor(s): Alicia Schatteman, Non-Profit and NGO Studies
Session Time: 9:00-10:15AM; Poster Number: 21

Social capital development for many, but not all, is a relatively organic process, and as social creatures, people work together to reach collective goals. The defined interactions related to the practices of societal norms, taboos, and broad cultural acceptance are constructs of communal decisions lending deep credence to the value of any number of the social capital definitions. However, opportunities are not always readily available to individuals living with disabilities, so they can and do get left out to varied degrees. With unsurprising results, previous research relied on comparing survey data from individuals with and without disabilities to identify possible areas of focus to better aid the disability community with integration and opportunity (Dimakos et al., 2016). Utilizing the study led by Dr. Christina Dimakas as a guide, and with special appreciation to Dr. Al Condeluci for his survey instrument and insights, a modified version of the projects survey and semi-structured interview methods will be utilized in a focused study on the adaptive diving program participants of the nonprofit organization Diveheart. This study seeks to explore to what extent the participants understand their social capital development, its value to the individual, and through the lens of sustainability, how they utilize it in their lives. This focus group research is expected to show an adapting and integrated disability community.

No strings attached: Investigating the effects of radiation therapy on mouse (Mus musculus) fine motor control.
Presenter: Christopher Wright
Radiation therapy, although instrumental today in treating cancer, often produces long-lasting and debilitating behavioral impairments for its surviving patients. While the occurrence of radiation-induced brain injury has been firmly established, gaps remain in our understanding of its relationship with performance on specific behavioral tasks, a phenomenon commonly known as brain fog. To better characterize this relationship, the present study investigated the effects of therapeutic radiation exposure on mouse string-pulling behavior, a skilled fine motor task. Ten male adult mice (PND90) were randomly assigned to either an acute 8 Gy ($^{137}$Cs g irradiation) exposure to the head or no irradiation. After recovering for 20 days, the mice were tested in a string-pulling task. To assess accuracy of string-pulling, contacts and misses were analyzed frame-by-frame. DeepLabCut, a machine learning network, was used to digitize hand position. The resulting x- and y-coordinates were used to calculate kinematic (peak speed) and topographic (direction) characteristics of string-pulling components (reaches and withdraws). T-tests revealed no significant differences in contacts and misses ($p > .05$). Repeated-measure analyses of variance (ANOVA) were conducted on kinematic measures and found no significant effect of group, hand, or Group x Hand interaction ($p > .05$). This pattern of results suggests that therapeutic-level cranial irradiation may not disrupt fine motor control at the given time point. However, considering the complex nature of radiation-induced cognitive impairment, further dimensions should be explored. Using more delayed time points or alternative mouse strains may provide additional opportunities to investigate fine motor control deficits associated with brain fog.

Pixel-Wise Machine Learning and Deep Learning Methods Implementation on Multi-Class Wildfire Mapping
Presenter(s): Mingda Wu
Faculty Mentor(s): Wei Lou, Earth, Atmosphere and Environment
Session Time: 12:45-2:00PM; Poster: 119
Honors Capstone

Wildfires are destructive natural hazards. Artificial Intelligence (AI) has been a trendy topic in recent years due to its powerful applicability. This study focuses on the use of artificial intelligence (AI) in hazard management, specifically in the field of wildfire mapping. Machine learning and deep learning are two concepts that are in the subset of AI. This study applied pixel-wise machine learning and deep learning methods to do multi-class mapping on two wildfire events in California, USA. The purpose of this research is to demonstrate the usefulness and advantages of using AI in the field of hazard management. The machine learning methods selected are Random Forest, eXtreme Gradient Boosting and Support Vector Machine. The deep learning method used is U-Net. The results indicate that U-Net did the best job at classifying wildfire events, while SVM had the best performance among machine learning algorithms. U-Net is the most time-consuming model due to the nature of deep learning. The models may be tuned to have better performances, and it would be better to use hand-labeled masks to make the deep learning model more useful in more complex conditions. This research emphasizes that the use of AI in hazard management can improve the accuracy and efficiency of wildfire mapping. Overall, the study demonstrates the usefulness and advantages of using AI in wildfire mapping and provides insights into how this technology can be further optimized for hazard management.

The Effect of Color on Flavor
Presenter(s): Tiffany Yoo Faculty Mentor(s): Katja Wiemer, Psychology Session Time: 9:00-10:15AM; Poster: 25 Honors Capstone

Color and its relation to flavor, is a complex cognitive phenomenon that researchers today are still trying to decipher. The present study is an examination of the history of color, taste, process of color perception, the effects of additional factors such as saturation, the exploration of senses that may potentially affect perception, and the different theories hypothesized from the time it was discovered. The purpose of this project was to review, revise, and narrow down which theories can be deemed the most accurate with the support of modern literature. While a clear-cut answer was not concluded, two potential answers were found to be heavily supported by modern literature.
College of Health and Human Sciences

Improving Quality of Life of Diabetics and their Caregivers through Intervention and Education
Presenter(s): Miguel Alvarez Jr  
Faculty Mentor(s): Sheila Barrett, Nutrition and Dietetics  
Session Time: 9:00-10:15AM; Poster: 40

The purpose of this study is to assist older adults with managing their type 2 diabetes and reduce the risk of CVD. Diabetes reduces the lifespan of adults over 50 years of age and leads to heart disease and stroke due to high blood pressure and cholesterol levels. A longitudinal intervention study for older residents with T2D of DeKalb County was designed and participants completed pre and post measures of fasting plasma glucose, total lipid panel, cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein Cholesterol (HDL-C) and triglycerides (TG), blood pressure, anthropometric and body composition, ADLs, IADLs, depression, and stress.

Gender Differences in Administration of tPA in Treatment of Ischemic Stroke
Presenter(s): Christina Annerino  
Faculty Mentor(s): Anitha Saravanan, Nursing  
Session Time: 10:15-11:30AM; Poster: 49

As medicine and pharmacology have advanced through the years, new life-saving treatments are studied or discovered every day and having a medical emergency is no longer a death sentence. Even with conditions as serious as an ischemic stroke there is hope for survival and rehabilitation with the so-called ‘clot-busting’ drug tissue plasminogen activator, colloquially known as ‘tPA’. tPA is a thrombolytic agent, meaning that it is a substance that acts on clots to dissolve them and break them down so they can no longer cause a blockage in the blood vessel that results in a stroke (Vega, 2022). Not all patients are equally as likely to receive tPA in a manner effective enough for its full therapeutic and life-saving effects to be experienced. Despite women having a higher stroke rate than men on average (Gasbarrino et al, 2022), they are less likely to be triaged correctly and have rapid administration of tPA to treat their stroke when compared to their male counterparts (Bushnell et al, 2018). Due to this phenomenon, there is speculation on what correlation may exist between gender differences and quality of the treatment received for emergency conditions involving obstructed vessels such as strokes and myocardial infarction. There are both social and biological factors that may contribute to differences in quality, speed, and overall efficacy of care between men and women, but there are no distinct determinants of this disparity that have been identified in the existing literature so far.

Prevalence of Chronic lymphoid leukemia (CLL) across various populations
Presenter(s): Vaidehi Brahmbhatt  
Faculty Mentor(s): Anitha Saravanan, Nursing  
Session Time: 12:45-2:00PM; Poster: 48  
Research Rookie

The most frequent type of leukemia in the United States is Chronic Lymphoid Leukemia (CLL). CLL is a slow-progressing form of leukemia wherein CLL cells proliferate into secondary lymphoid organs i.e., lymph nodes and spleen. According to existing literature, CLL is more prevalent in middle-aged and older adults and men (Rozman & Montserrat, 1995). While CLL predominantly occurs in white men, the disease is not absent among other races, genders, and ages. Hence the goal of this literature review is to understand the prevalence of CLL across populations (including race, gender, and sex) and the differences and similarities between the severity of illness so future studies can address social determinants of health in CLL.
Perceptions of discrimination and intervention services by Asian and Asian-American caregivers of children with disabilities during COVID-19
Presenter(s): Angelika Cabang
Faculty Mentor(s): Janet Olson, Allied Health and Communicative Disorders
Session Time: 12:45-2:00PM; Poster: 50
Honors Capstone

COVID-19 caused country-wide school closures starting in the spring semester of the 2019-2020 school year. Closures had a particularly significant impact for children receiving special education services. It is not known if Asian-American families experienced increases in discrimination that may have impacted their children’s special education services or if their experiences with special education services changed as the pandemic continued. Therefore, it is important to determine if as time has gone by, and Asian-American and Pacific Islander (AAPI) hate becomes less in the minds of the public, the impact of the pandemic in 2023 continues on special education services for children from Asian-American families. Data was collected using an anonymous, 10–15-minute survey through NIU Qualtrics. It involved questions such as background demographics, the types of services the child received in 2020 and 2023 and how often, how COVID-19 affected their child’s intervention quality/needs, as well as effects of COVID-19 on discrimination.

Revitalizing Memories through Melody: Utilizing Music as a Form of Memory Therapy for individuals with varying levels of Dementia, A Single Case Study
Presenter(s): Isiah Bryant A. Camarao, Research Rookies
Faculty Mentor(s): Jamie Mayer, Allied Health and Communicative Disorders
Session Time: 12:45-2:00PM; Poster Number: 38

Dementia is one of the most common neurological conditions affecting older adults. As an umbrella term for many different degenerative diseases (e.g., Alzheimer’s disease), dementia may affect all walks of life and day-to-day function. Presently, there is no cure for dementia pathology, leaving management of symptoms as the primary care approach. Hence, the aim of this study was to determine if listening to personalized music can serve to improve quality of life for individuals with dementia, specifically through two possible mechanisms: (1) increased retrieval of remote episodic memories, and (2) increased engagement with the surrounding environment. The study makes use of both qualitative and quantitative approaches to measure engagement or reactivity and as well as the effect of music to individuals’ memories and if they could remember even minor details from their past life experiences through an analysis called the dendrogram. The data were gathered through one-on-one sessions recording both verbal and non-verbal cues and were analyzed thoroughly constructing the findings that come in the form of a simulacrum. Qualitative data, gathered across three sessions immediately after the study participant listened to music, revealed four themes: (1) Professional which relates to all the experiences relating to work and even the work of their family, (2) Educational denotes school life when they were young including colleges and the experiences that they reminisce during those period or the courses they took, (3) Familial showcases their family dynamics and memories that relates to the familial experience, and (4) Personal demonstrates experiences, knowledge, and memories regarding their activities when they were younger. Preliminary data showed that music made a positive impact on an individual with dementia in terms of both memories retrieved and constructive engagement with the environment. We suggest that personalized music can and should be used to maximize quality of life for those with dementia. Future research could include combining music with visual aids or bodily kinesthetic memory therapy.

Feasibility and Acceptability of an Online Intervention to Improve the Health and Well-being of Informal Caregivers of Individuals with Alzheimer’s Disease
Presenter(s): Lily Derain
Faculty Mentor(s): Yujun Liu and Courtney Hughes, Health Studies
Session Time: 10:15-11:30AM; Poster: 54

This study is designed to improve the health and well-being of informal caregivers of individuals with Alzheimer's disease in DeKalb County, particularly those caregivers of low-income. We aim to develop and examine the acceptability and feasibility of a remote educational intervention that would effectively improve the health and well-being of informal caregivers of Alzheimer's Disease patients. By developing and offering a series of three, 30-minute each, free education and peer support
sessions addressing the major personal health and wellness difficulties faced by caregivers of individuals with Alzheimer's Disease, we provided information and support to individuals who often sacrificed their own personal care to help their loved ones. 31 Participants were randomly assigned to one of two conditions: Participants in the treatment condition attended the online training sessions with the researchers facilitating the sessions and interacted with their group members in discussions for 4 weeks. Participants in the control group reviewed the training sessions on their own with no researchers facilitating the sessions. Outcome variables included physical health, nutrition intake, and stress. The results revealed that both participants in the experimental condition and control condition reported better physical health and nutrition intake after implemented interventions as compared from the pretest to the posttest. However, these effects were not maintained at the one-month follow up. This research is a pilot implementation project including education resources that we may draw upon along with using published instruments to assess education outcomes. Helping informal caregivers of individuals with Alzheimer's Disease regarding their personal health and well-being can also improve the quality of life for the patients they care for.

Comparing a Non-Word Repetition Task Performance to a Standardized Morphosyntax Measure in Bilingual Spanish-English Children
Presenter(s): Emily Freeman
Faculty Mentor(s): Milijana Buac, Allied Health and Communicative Disorders
Session Time: 11:30-12:45PM; Poster: 47
Honors Capstone

To diagnose a child with a language impairment, speech-language pathologists (SLPs) most often rely on standardized norm-referenced assessment tools. However, current norm-referenced assessment tools used to make speech-language diagnostic decisions are often not representative of the linguistic variability observed in many children in the United States. A large proportion of children growing up in the United States are dual-language learners and these children are often not included in the normative sample of many standardized norm-referenced assessment tools used to assess language skills resulting in risk for over-identification of dual language learners with language impairment. This issue creates a need for bias free assessment tools. One approach to help reduce bias in assessment is the use of processing-based tasks. These tasks attempt to reduce bias by focusing on overall skills such as memory and eliminate the reliance on prior linguistic knowledge. One processing-based measure that has shown diagnostic potential is a non-word repetition task. In this task, clients are asked to repeat non-sensical words that are based on a languages’ phonotactic structure while systematically increasing in length and complexity. In the present study, we administered two non-word repetition tasks to Spanish-English bilingual pre-school age children (N = 11; Mean age = 5.19, SD = 0.79). Children completed one non-word repetition task in which the non-words were based on English phonology and one where the non-words were based on Spanish phonology. Correlation analyses were used to compare the performance on the non-word repetition tasks to a standardized measure of morphosyntax and a parent rating of children’s language skills. The results revealed that the non-word repetition task has diagnostic potential but appears to be more suitable for the weaker language. Specifically, a significant correlation between the non-word repetition task and the standardized assessment was only found in Spanish but not in English, and all participants had lower Spanish language skills. Thus, present findings warrant further investigation into how non-word repetition tasks can be used with bilingual children, especially when their language skills are not equally balanced.

Machine Learning of Accurate Rhotic Productions
Presenter(s): Rutba Khan, Research Rookie
Faculty Mentor(s): Sherrill Morris, Allied Health and Communicative Disorders
Session Time: 11:30-12:45PM; Poster: 45

American /r/ is a common sound in the English language, and distortion of the /r/ impacts intelligibility. Individuals who learn English as a second language may have difficulty in /r/ production, especially if their native language does not have an /r/ or the /r/ is produced differently than the English /r/. Given the complexity of the /r/ production, it is important for individuals to receive immediate feedback regarding the accuracy of their productions. Therefore, the development of a feedback mechanism that individuals could use on their own would be helpful. This study aimed to collect data for future analysis to determine if machine learning principles can be used to determine if a production of /r/ is correct or incorrect.
Social Determinants of Health and Inflammation in Non-Specific Low Back Pain: A Systematic Review
Presenter(s): Sameera Sanders
Faculty Mentor(s): Anitha Sarvanan, Nursing
Session Time: 10:15-11:30AM; Poster: 52

The purpose of this research was to discover the pro-inflammatory cytokines involved in Non-Specific Low Back Pain (NsLBP) and to discover the social determinants of health including age, gender, race, location, income, education, and urban and rural settings of the participants with NsLBP. The purpose of identifying cytokine markers and the social determinants of health is to determine if there are correlations between the two, and the extent in which studies include the social determinants of health, so that interventions can be created with a holistic approach. Focusing on cytokine markers in this study is because the production of cytokines contributes to pain and inflammation. The study involved conducting a review of existing studies involving non-specific low back pain with cytokine involvement to determine if social determinants of health were considered. The study involved conducting a review of existing studies involving non-specific low back pain with cytokine involvement to determine if social determinants of health were considered. The study involved conducting a review of existing studies involving non-specific low back pain with cytokine involvement to determine if social determinants of health were considered. Therefore, the correlation of inflammatory markers and the social determinants of health cannot be concluded. This research holds significance because in having this knowledge, our health care teams can have a better understanding of the diagnosis of non-specific low back pain for their patients. Also with this knowledge, future interventions can be created that target the most common inflammatory markers to reduce inflammation and pain, which would increase the quality of life for individuals with Non-Specific Low Back Pain. With the addition of the social determinants of health data including race, age, and location, the interventions would also help a wider, diverse range of individuals.

Indonesian Women’s Perceptive on Partner’s Smoking
Presenter(s): Jennifer Schaumberg
Faculty Mentor(s): Tomoyuki Shibata, Public Health
Session Time: 9:00-10:15AM; Poster: 118
Research Rookie

Smoking is the leading cause of lung cancer. In Indonesia, the prevalence of male smoking (54.4%) is significantly higher than women smoke (p = 0.050) as likely to be bothered by their future husband’s smoking compared to married women’s current husband. Single women are two times (OR = 2, p = 0.049) more likely to stop their partner’s smoking in public areas compared to married women. Muslim parents were 3 times (OR = 3, p = 0.027) less likely to ask their children to purchase cigarettes and were 3 times (OR = 3, p = 0.006) less likely to set up their children with smokers compared to Christian parents. This study suggests that women’s empowerment and support from faith-based organizations would contribute to reducing Indonesian male smoking to protect women and children from second and third-hand smoke.

Mothers’ Use of Internal State Words with Toddlers with and without Hearing Loss during Natural Play
Presenter(s): Sarah Screnock
Faculty Mentor(s): Janet Olson, Allied Health and Communicative Disorders
Session Time: 9:00-10:15AM; Poster: 46
Honors Capstone

This study examined differences between mothers’ use of internal state words with toddlers with hearing loss and toddlers without hearing loss. Mothers’ speech to toddlers without hearing loss and mothers of toddlers with hearing loss engaging in natural play was transcribed and analyzed using Systematic Analysis of Language Transcripts (SALT). Twelve toddlers with hearing loss were age matched and language matched by MLU with twenty-four toddlers without hearing loss. Mothers’ internal state words were identified and categorized by type as perception, volition, disposition, and cognition. There was no significant difference between mothers’ use of internal state words between toddlers with hearing loss and toddlers without hearing loss. Overall, mothers used fewer disposition and more cognition words.
Whatever Happened to Dating? Exploring the Recent Trend of Just Talking in Romantic Relationship Formation

*Presenter(s):* Katherine Smail and Isabella Boccia  
*Faculty Mentor(s):* Scott Sibley, Human Development and Family Sciences  
*Session Time:* 10:15-11:30AM; *Poster Number:* 41

Emerging adulthood is characterized by romantic relationship decisions and prospects of finding a long-term partner. Recently, emerging adults have experienced more ambiguity in their relationships which has been complicated by the use of smartphones and dating apps. The traditional progression of courtship and relationship formation has diversified, giving way to new types of relationships such as “hooking up” or “friends with benefits.” This study explores a relationship type referred to as “just talking” and how emerging adults initiate and experience this and the reasons behind this process. The study includes nine focus groups which discussed the recent trend of “just talking” through three research questions. These are the following: How do emerging adults conceptualize just talking? What are emerging adults’ reasons for just talking? How does emerging adulthood technology facilitate the just talking process? Eleven themes resulted from the qualitative data. The results showed that “just talking” relationships are heavily rooted in technology use and experience a lot of ambiguity. Emerging adults who engage in these types of relationships often experience less commitment from their partner and are left confused and often hurt.

Assessing Critical Thinking Skills of Students in a Certified Family Life Education (CFLE) Approved Program

*Presenter(s):* Abigail Taylor and Katherine Smail  
*Faculty Mentor(s):* Jane Rose Njue, Family and Consumer Sciences  
*Session Time:* 11:30-12:45AM; *Poster:* 39

This research assesses students critical thinking skills that are demonstrated through group projects in solving ethical dilemmas guided by the Domains of Family Practice Model in a CFLE approved professional development course. Many academic institutions develop their curriculum with the goal of developing critical thinking skills in students. Critical thinking skills are important because they enable students to develop strategies that increase success in the workplace as well as their personal lives. A rubric to measure critical thinking was developed by mapping eight steps in solving ethical dilemmas into six levels of progression in thinking. These levels are as follows: remembering, understanding, applying, analyzing, evaluating and creating. These are reflected in the Revised Bloom’s Taxonomy of Education Objectives developed by Anderson, and Krathwohl (2016; 2001). Each of these levels was assessed as beginning, developing, proficient, and accomplishing in terms of the ability to successfully solve ethical dilemmas. The rubric was used to evaluate 15 group assignments that were already graded in solving ethical dilemmas completed in 2016, 2017, 2018, and 2019. Research indicates that a majority of the groups were able to meet all five levels of critical thinking as described in the accomplished and proficient competency criteria. In addition, some ethical dilemmas elicited better scores than others. The results have informed the teaching strategies in the professional development class.

"Maybe Someday I'll Get Married": Exploring Emerging Adult Beliefs about Commitment and Couple Relationship and Marriage Postponement

*Presenter(s):* Breanna Terry and Jessica Lopez  
*Faculty Mentor(s):* Scott Sibley, Human Development and Family Sciences  
*Session Time:* 9:00-10:15AM; *Poster:* 51

The age at which emerging adults are getting married has started to increase. In the United States, the average age at which men are getting married is 30 and for women it is 28 f. Marriage has remained the gold standard and has created a significant difference for society and families by helping them with the ability to cope with life’s challenges. The purpose of this study was to explore how emerging adults (18-29 years old) have personally constructed their definitions of commitment in romantic relationships and why emerging adults believe that many are postponing marriage. 20 (10 men, 10 women) unmarried emerging adults at a large Midwestern university participated in interviews. 55% of the participants were in a romantic relationship (10 with opposite-sex partners, one with a same sex partner) at the time of the study. 85% of the participants indicated that they had previously been in a romantic relationship.
Comparing Autistic and Typically Developing Children’s Definitions of Real and Novel Words
Presenter(s): Henry Tomiser
Faculty Mentor(s): Allison Gladfelter, Allied Health and Communicative Disorders
Session Time: 12:45-2:00PM; Poster: 44
Research Rookie

To improve language outcomes for autistic children, it is important to understand how they learn words. Our understanding of autistic children’s semantic learning may be incomplete due to the possible failure of recognition tasks to fully capture semantic knowledge. The present study seeks to explore autistic children’s learning of real and novel words through an open-ended definition task. 11 autistic children and 13 of their typically developing (TD) peers completed real and novel word learning paradigms. Their definitions were coded for processing level and semantic feature types. For both groups, definitions of real words contained a greater number of accurate semantic features than definitions of novel words. The autistic children produced fewer accurate semantic features than their TD peers. They also produced fewer local and perceptual features than their TD peers. Finally, both groups produced more functional, thematic, and ‘other’ features for real words than novel words. These findings have implications for vocabulary-learning instruction aimed towards autistic children.
College of Education

Exclusionary Practices: Undocumented Immigrants in the U.S. Health Care System
Presenter(s): Liliana Bañuelos
Faculty Mentor(s): James Cohen, Curriculum and Instruction
Session Time: 12:45-2:00PM; Poster: 53
Honors Capstone

Contrary to popular belief, the U.S. health care system is woefully exclusionary to many members of society. Over the past century, the U.S. congress has passed several immigration and health care acts that have resulted in exclusionary practices towards undocumented immigrants. From President Nixon’s 1973 Health Maintenance Organization Act—where private health insurance was introduced thereby transforming the U.S. Health care System, to President Trump’s Public Charge Executive Action of 2020 which excluded undocumented immigrants from publicly funded health care by preventing status change if they did so, undocumented immigrants have been specifically excluded from utilizing the public benefits of the U.S. health care system. This paper reviews the various immigration and health care acts passed by congress over the past 70 years and contextualizes the current state of health care amongst the undocumented immigrant community. We explore the subsequent ramifications of these exclusionary practices and conclude with possible systematic suggestions.

The Effect of Posture and Elbow Position on Muscular Grip Strength in Apparently Healthy Older Adults
Presenter(s): Matthew Herring
Faculty Mentor(s); Emerson Sebastiao, Kinesiology and Physical Education
Session Time: 9:00-10:15AM; Poster: 43

Handgrip strength (HGS) is regarded as a marker of overall body strength and physical function in older adults. However, numerous factors have been shown to influence HGS performance. This study examined the effects of posture and elbow position on HGS performance in older adults. Seventy-four older adults were recruited and enrolled in the study. All participants had their HGS assessed in two different postures: a) standing with elbows fully extended, and b) sitting with elbow at 90-degree angle. For each posture, HGS performance was expressed for dominant and non-dominant hand, and peak HGS. HGS performance (dominant, non-dominant, and peak HGS) was not found to be significant different (p >.05) comparing the standing versus the sitting posture. However, within posture analysis revealed a significant difference (p >.05) between dominant versus non-dominant hand for both postures adopted. Our findings suggest that HGS performance among older adults is similar when comparing assessment in the sitting position with elbow at a 90-degree angle and the standing position with elbow fully extended posture, and this was independent of the hand assessed or peak value. However, significant differences were observed between dominant and non-dominant hands within the same posture. HGS is an important indicator of older adults’ physical health, and this measure is part of the protocol used to diagnose important conditions in this population. Thus, uniform standard procedures/methods to assess HGS should be the focus of future studies as it would enable more consistent measurement of HGS and facilitate the comparison between studies.

Multilingualism and Augmentative Alternative Communication; A Review of the Literature
Presenter(s): Hannah Lamarca
Faculty Mentor(s): Natalie Andzik, Special Education
Session Time: 9:00-10:15AM; Poster:61
Honors Capstone

Approximately two million individuals living in the US have disabilities that make communicating very challenging. These individuals have “complex communication needs” and require the use of augmentative and alternative communication (AAC) to support their communication (e.g., iPad-supported speech output devices). Individuals who are bilingual or come from culturally and linguistically diverse backgrounds are often left without adequate access to these AAC devices and apps because most only offer an English option. In a similar fashion, most AAC devices are programmed to let a user access only a single language at a time, regardless of the device’s multi-language option. We have conducted a review of the literature to better understand the current practices for practitioners who support the speech of bilingual individuals who also use AAC when
communicating. We will report our findings as they relate to best practices for practitioners to help individuals to access multilingual AAC. We will also discuss how to best serve those of culturally and linguistically diverse backgrounds with complex communication needs.

**Fear of Falling is Associated with Reduced Lower-Extremity Function in Older Adults**

*Presenter(s): Margi Patel*

*Faculty Mentor(s): Emerson Sebastiao, Kinesiology and Physical Education*

*Session Time: 12:45-2:00PM; Poster: 42*

Fear of falling (FOF) is a risk factor for reduced quality of life, activity curtailment, and fall risk, which is to say it is a public health concern. This study investigated the association between FOF and lower-extremity function (LEF) in older adults. This study assessed 100 older adults aged 65 years and older living in a retirement community. FOF was assessed using the following question: “Are you afraid of falling (YES/NO)?” whilst LEF was assessed using the Short Physical Performance Battery (SPPB). The SPPB is an objective assessment of LEF comprising a 3-part assessment: standing balance, gait speed, and lower-extremity strength. Performance scores for each individual assessment (0 to 4) and a summary score (0 to 12) aggregating the individual assessments are calculated as per standard SPPB protocol. Higher scores reflect better LEF. Our findings suggest that FOF negatively impacts lower-extremity function in older adults potentially due to activity restrictions. It is important to develop strategies and interventions aiming at helping individuals minimizing FOF.

**How do Educators Support the Communication Access for Children with Multiple Cognitive Disabilities and Who Are Blind?**

*Presenter(s): Lana Samuel*

*Faculty Mentor(s): Natalie Andzik, Special Education*

*Session Time: 12:45-2:00PM; Poster: 62*

*Research Rookie*

Many diverse types of assessments are used to guide educators on the type of education needed for children with disabilities. For children with visual impairments, this paper/poster will also explain the different assistive technology used in a classroom such as augmentative and alternative communication devices and how effective it can be. Augmentative alternative communication or assistive technology has helped education expand the opportunities for children with disabilities. Technology has helped educators and children with disabilities in the classroom make communication easier and more interactive, supplies talk-to-text speech, helps determines their understanding of the materials provided in class by supporting them and much more. There were different acts and laws placed to improve the education of children. The *Individuals with Disabilities Education Improvement Act* in 2004 made sure to improve the participation of children in general education. The IDEA requires that students with disabilities have individualized education plan (IEPs) developed for them that emphasize special education services provided within the general education program and require “consideration” of assistive technology to support their participation in special education programs (Parette, H.P, & Peterson, 2010). Assistive technology refers to any item or equipment that can increase or improve the function of an individual with disabilities. Understanding that all children learn at different paces and comprehension levels also affects how educators need to instruct their students. Educators need to conduct different assessments for their students to learn about their skills and capabilities that they may need improvement on. The importance of properly placing a child in the proper classroom is based on their identification with their disability, assessments were taken, and the category for the IEPs.

**Mental Health and Division I Athletes**

*Presenter(s): Brianna Tillett*

*Faculty Mentor(s): Dawn Norwood, Kinesiology and Physical Education*

*Session Time: 12:45-2:00PM; Poster Number:11*

Mental health issues are becoming more prominent in college athletics. There is, however, a stigma associated with seeking mental health care. Additionally, there seems to be a lack of available and effective care for college student-athletes. A recent survey conducted by the National Collegiate Athletic Association (NCAA) revealed that 65% of female and 48% of male Division I athletes reported feeling mentally exhausted (NCAA, 2022). Some colleges have attempted to address these mental
health issues by creating programs and initiatives designed to meet the needs of student-athletes outside the field of play. For example, Texas A&M University created a student-led initiative to address athletes' mental health. Similarly, the University of Michigan constructed an athletic counseling team composed of mental health practitioners who work directly with student-athletes. Mental health concerns, such as anxiety (Ford et al., 2017), can be significant to an athlete's performance. Preventative mental health care and increased advocacy are practices that could be beneficial not only to the athletes, but also their athletic programs. Even though mental health issues are more accepted, practices like these could help reduce the remaining stigma and improve mental health in Division I college athletics.
This project involved learning how to prepare, mount, and install a museum exhibit for the Burma Art Collection. This involves learning how to handle artifacts and how to learn and investigate the pieces. Much of the work consists in appreciating the profundity and responsibility of preserving important historical moments, such as that of the civil war in Burma.
College of Business

Complexity of Perfection in the Art Industry
Presenter(s): Ayanna Johnson
Faculty Mentor(s): Bart Sharp, Management
Session Time: 12:45-2:00PM; Poster: 64
Honors Capstone

This research explores the ways in which perfection has been presented in the art industry. Perfection is a concept and/or idea that is dealt with among creative and non-creative individuals alike. Conducting this research provides an in-depth analysis into the ideologies obtained from white systematic perceptions. My passion for the decentralization of the arts and providing oppressed groups a platform to exhibit artwork in a grand setting is the premise for the project. Methods taken to conduct this study were curation of an art exhibition at Addington Gallery where undergraduate and graduate Visual Art students displayed their original artwork exploring this idea. Curating this exhibition show is grant funded from the University Honors Program's Enhance Your Education research grant. Having the chance to curate this show has been an incredible honor, and I hope all artists involved can approach their artwork from a different lens.

Coaching and Mentoring Programs Ensuring Equal Opportunities to Higher Education for Laotian Students
Presenter(s): Vilaya Sirivong
Faculty Mentor(s): James Burton, Management
Session Time: 10:15-11:30AM; Poster: 65
Honors Capstone

Laos is a developing country where quality education is in short supply. For the past years, teenagers and young adults have been applying to various scholarships to pursue their education somewhere else. According to Scholarshippads.com (2022), Lao students are generally eligible for more than 1000 different international scholarships every year. The education ranges from high school, course, associate, undergraduate, graduate, and doctorate degrees. Most of these scholarships and financial aid opportunities are partial to full expense funding. Even though students apply and desire to be selected, they do not meet the minimum criteria for adequate education, English language proficiency, application filling skills, interview skills, leadership experiences, work experiences, community involvement, and, most importantly, the value of their identity and story. This issue can be solved if students have the right guidance and understanding of what they can do to prepare themselves for such opportunities at an early age. The purpose of this project is to outline optimal and potential coaching and mentoring program for underprivileged and general students in Laos to ensure equal opportunities in applying for higher education scholarships abroad. Through survey response results and research, the program will explain the best ways students can prepare themselves for various scholarships. The programs will lessen the equity gap between high- and low-income families in Laos by allowing their children to have access to the knowledge and trainings they need to be successful in applying for scholarships helping them to break through the cycle of poverty through higher education.
College of Engineering

10 volts DC to 120 volts, 60Hz Sinusoidal Power Supply Design using PWM Technique
Presenter(s): Ram Baran Raut
Faculty Mentor(s): Donald Zinger, Electrical Engineering
Session Time: 12:45-2:00PM; Poster:109
Research Rookie

Power inverter is an electric device that converts electrical power from DC (Direct Current) to AC (Alternating Current) using electronics and control systems. Inverters are widely used in industries and home appliances and have become essential for our daily life. Inverters are used to power a UPS (Uninterruptible Power Supply), in high voltage DC transmission, in industrial motors, etc. In this research, a power inverter is designed which can convert a 10V (volts) DC power source to 120V (volts) RMS (root mean square) sinusoidal AC source. There are two design processes that can achieve the goal of this research and design. The first uses a boost converter to boost 10V DC to 120V DC and then an inverter to convert 120V DC to 120V AC. This method is not practically possible because it is for a single boost converter to develop such a large voltage increase. The second method to accomplish the desired goal is to first design an inverter that can convert 10V DC to 10V AC and then use a step-up transformer to boost 10V AC to 120V AC. A transformer is a device that uses magnetics to adjust AC voltages. In this research, the second method is used to achieve the goal. A complete circuit is designed and simulated using circuit simulation software. A full-bridge inverter is designed using four power MOSFETs (Metal Oxide Semi-conductor Field Effect Transistors) that are controlled using PWM (Pulse Width Modulation) technique. PWM is a method of using pulses of various widths to approximate a sinusoidal wave. The inverter first converts 10V DC to 10V square wave AC and then a step-up transformer is used to boost this voltage to 120V square wave. A cascade of three filters is used to modulate a 120V square wave into 120V RMS, sinusoidal AC.

3D Simulation of Blood Flow
Presenter(s): Mikayla Dirksen
Faculty Mentor(s): Jifu Tan, Mechanical Engineering
Session Time: 10:15-11:30AM; Poster: 108

3D modeling of the cardiovascular system and simulation of blood flow are useful tools to gain an understanding of blood flow and vessel wall behavior in normal and diseased cases. Due to practical limitations, it is impossible to examine and measure the properties and behavior of active blood flow in the in-vivo environment. In this study, we utilize SimVascular, an open-source 3D modeling software, to visualize blood flow velocity and wall deformation in a simple cylinder case. SimVascular's Fluid-Structure-Interaction feature uses coupling of fluid and solid mechanics equations with fluid and solid parameters typical of blood and blood vessels. The simulation visualized the wall deformation and velocity magnitude throughout the 3D cylinder over .008 seconds. We were able graph the maximum and average velocity values and determine the magnitude of the deformation of the wall. Further studies can be conducted simulating an anatomically accurate model of any normal or diseased vessel, and additional insight can be gained about how the blood flow and vessel walls are affected by cardiovascular abnormalities, such as an aneurysm, or cardiovascular implants.

In Pursuit of the Promise of Microfluidic Artificial Lungs
Presenter(s): Ryan Kilpatrick
Faculty Mentor(s): Alisha Diggs, Mechanical Engineering
Session Time: 12:45-2:00PM; Poster: 111

In recent years, there have been many efforts to improve on the current clinically used extracorporeal membrane oxygenators (ECMO). Microfluidic artificial lungs (µAL) have shown a much higher gas exchange efficiency with a lower blood priming volume than the clinically used hollow fiber membranes. Other advantages offered by µAL’s is biomimicry, where the microfluidic channels match flow properties seen in natural pathways, a nonporous membrane for gas exchange prevents the issue of gas leaks seen in the hollow fiber design, as well as boasting a lower hydraulic resistance, which lowers the pressure drop of the blood to a desired range (Potkay, 2014). In 2014, Joseph Potkay noted some of the challenges of the µAL, at the time, µAL’s required hundreds or even
thousands of the single-layer devices to reach a performance similar to that of the clinically used hollow fiber design. At this point in time, µAL’s such as one shown by Lachaux, et al., offer an easily stackable design, that doesn’t affect the pressure drop of the device. when stacked the µAL can get a higher flow rate with the same pressure drop. Lachaux, et al. estimates that it would take around 67 layers to reach a flow rate of 1 L/min which is comparable to clinically used devices. At this stage, many researchers are preparing their devices for in vivo study, and are getting closer with every iteration to a device that is ready for use in a clinical setting.

**Bi-directional In Situ Visualization and Analysis of Blood Flow Simulation**
**Presenter(s):** Joshua Lewicki and Christopher Roeder
**Faculty Mentor(s):** Jifu Tan, Mechanical Engineering
**Session Time:** 9:00-10:15AM; **Poster:** 110

Interactive simulation has numerous applications in engineering and medicine, particularly in the field of blood flow. In this study, the team has developed a bidirectional in-situ visualization and analysis tool designed for blood flow simulation. The goal was to provide virtual reality-based training for all medical professionals that would allow them to interact with the simulation in real-time. The tool’s interface was developed to modify flow simulation parameters, including cross-sectional area, flow rate and other medically relevant features. With this amount of control, the medical professionals can experiment with various scenarios and train in a safe and controlled environment. One of the most significant features of the tool is its real-time feedback system. Users receive real-time feedback on the effects of parameter changes, allowing them to make informative decisions based on the results of the simulation. The developed tool has innovative ways to improve effectiveness of medical training and better equip professionals to understand complex systems. In the future, the tool could be adapted for other medical applications and revolutionize the way medical professionals learn and practice which can further expand the impact of live interactive simulations to other fields.

**Predicting Solid Waste Generation: An Analysis of Socio-Economic Factors and Their Impact On Waste Management**
**Presenter(s):** Alejandro Trujillo Graciano
**Department:**
**Faculty Mentor(s):** Madhi Vaezi, Engineering Technology
**Session Time:** 11:30-12:45PM; **Poster:** 81
**Research Rookie**

There are two types of waste that are created by human production, solid and municipal solid waste (MSW). Municipal waste is created on a small scale, for example, when humans throw away garbage and plastic. On the other hand, solid waste is the byproduct of large industry production. Currently the state of Illinois has 35 landfills, and around 35% of recyclable materials are recycled. The remaining 65% of recyclable material ends up in the 35 landfills in Illinois. These landfills create around the same number of emissions as 460,000 passenger vehicles. Studies have shown negative environmental effects, such as affecting the biodiversity of the surrounding areas. Increasing the diversion rates will allow a decrease in carbon emissions of the landfills and increase the waste to energy conversion by properly diverting waste to energy conversion facilities such as recyclable centers.

**Building an Autonomous Vehicle in a ROS-based Simulation Environment**
**Presenter(s):** Amit Chaudhary
**Faculty Mentor(s):**
**Session Time 9:00-10:15AM; Poster: 113**
**McKearn Fellow**

This paper presents an implementation of a scaled autonomous vehicle with a robot operating system (ROS). For the process of developing and testing a new model, it is efficient to use the physical model along with a simulation. Hence, the vehicle utilizes 2D Lidar in the simulated environment using Gazebo, RVIZ with ROS 2D navigation stack and g-mapping SLAM (Simultaneous Localization and Mapping) technique. The model of the autonomous vehicle is scaled to 1/16th of the actual vehicle. The model of the vehicle is created/ described using Universal Robot Description Format (URDF) and the environment/ world for the robot is created using Gazebo insert and drag-drop features. This paper illustrates that the same piece of code used in the simulation can be implemented into the
actual physical models with modification. The benefits of using scaled autonomous vehicles for experiments include cost and time efficiency and safety is maintained.

2D Additive Manufacturing Melt Pool Simulation using INL MALAMUTE FEM Software Presenter(s): Matthew Peterson
Faculty Mentor(s):
Session Time: 11:30-12:45PM; Poster: 112

The field of additive manufacturing (AM) is still in its early stages, and as such, there are limited models available for accurate predictive multiscale modeling. However, advanced simulation technology, such as Moose from Idaho National Laboratory (INL) can be used for this purpose. It is an object-oriented FEM software for multiphysics simulations. The MALAMUTE application for Moose, intended for advanced manufacturing techniques, has been used here. In this simulation, an adaptive meshing technique was used to ensure precise modeling of the heat transfer, fluid dynamics, and phase change processes. Additionally, the free surface model was implemented using the level set method, allowing for accurate representation of the system’s free surface interface, and how it changes as the laser melts the powder bed. To demonstrate the capabilities of this approach, the simulation was run for 1000 timesteps. The velocity, temperature, level set, and pressure data visualized in ParaView show the process and its potential for future development. In the future, a further development of this could be used in industry as a predictive tool to increase the efficiency of the AM process and reduce the unpredictability that currently limits the utility of AM.
**Sycamore High School**

**Temperature’s Effect on Chemicals in Streams within the East Branch of the South Branch of the Kishwaukee River Subwatershed**

*Presenter(s): Quin Dukes  
Faculty Mentor(s): Scott Horlock, Biology  
Session Time: 10:15-11:30; Poster: 82*

Climate change presents an increase in average temperature, as well as destabilization of chemical balances in aquatic ecosystems (Mujere 2018). Many factors should be checked against rising temperatures to predict its effects on the ecosystems at large. This research reviewed chemical analysis data from streams and agricultural ditches within the East Branch of the South Branch of the Kishwaukee River subwatershed (EBSB) dating back to 2014. Chemical factors such as pH, nitrates, nitrites, ammonia, phosphates, sulfates, and sulfides were compared to air temperatures. Moderate to high correlations were found between air temperature and pH, nitrate, sulfide, and ammonia. Those values being 0.671 for pH, 0.628 for nitrate, -0.704 for sulfide, and -0.763 for ammonia. Zero to low correlation was found in nitrite, sulfate, and phosphate. Those values being 0.289 for nitrite, -0.0699 for phosphate, 0.0867 for sulfate.

**The Impact of pH in Streams on Biotic Index**

*Presenter(s): Sophia Klacik and Quinn Fischer  
Faculty Mentor(s): Mr. Scott Horlock, Biology  
Session Time: 10:15-11:30AM; Poster: 85*

In water chemistry pH is important because the level of acidity in the water can affect the health of the organisms living in the river or streams. If the pH is low, the water is too acidic and if the pH is high the water is too basic. Most organisms thrive in a pH of 7, which is a neutral pH (Sute, Glenn et al 2023). When looking at the correlation between pH and biotic index there is shown to be a moderate relationship. The closer the pH is to 7.0 on the pH scale the better the biotic index. When the pH is higher or lower the biotic index tends to be lower in rivers in Illinois. Biotic indices and pH were measured at various sites throughout the East Branch of the South Branch of the Kishwaukee River Subwatershed (EBSB). Testing for the biotic index at each stream, by sifting through the substrates, under logs, and in thickets to find different species of aquatic invertebrates. Comparing the pH and biotic indices at the various sites, there was a -0.450464984 correlation between the pH and biotic indices of rivers. The number shows a moderate correlation between pH and biotic index. Mussels in rivers showed an increase in mortality rate when the pH was below 7.0. Other aquatic invertebrates showed a similar trend, when the pH was lower than 7.0 the mortality rate increased (Taskinen et al 2011).

**Impact of Water Quality on Biotic Indices**

*Presenter(s): Sheyene Lathrop  
Faculty Mentor(s): Scott Horlock, Biology  
Session Time: 10:15-11:30AM; Poster: 83*

Blanco and Bacares (2010) found that biotic indices have a sensitivity to water quality. Triest et al (2001) found a close relationship between macro-invertebrates and chemical variables linked with river basin characteristics such as chlorides, alkalinity and oxygen concentration. The purpose of this study was to analyze and compare pH and phosphate levels indicated in the stream and their effects on the biotic indices in Virgil Ditch #3, Kane County, Illinois. Research conducted in 2015 indicated a pH of 7.81. In 2022 the pH had increased to 8.23. Phosphate levels increased, from 2015 measuring 0.46 mg/L to 2022 measuring 0.48 mg/L. Using a biotic index in 2015 had revealed the stream's quality was good measuring at 3.286 and in 2022 it decreased to fair measuring 2.2. The data shows there is a negative relationship between pH and biotic index as well as between phosphate levels and biotic index.
Quantifying Mussel Diversity within the South Branch of the Kishwaukee River Watershed
Presenter(s): Hope Nordbrook, Breanna Anderson, and Lucinda Davison
Faculty: Scott Horlock
Session Time: 10:15-11:30; Poster: 86

Freshwater mussels are the most endangered group of organisms in the United States (Modesto et al. 2017) so it can be difficult to determine where conservation efforts should be focused. To determine which streams are in greatest need of preservation, a numeric system was designed based on the Coefficient of Conservatism used for evaluating plant communities. The Coefficient of Conservatism was created by Floyd Swink and Gerald Wilhelm (1994) to, in part, evaluate where conservation efforts should be focused for plants. Like plants, mussels range from specialists to generalists in terms of niche requirements. This research is an attempt to create a similar numeric system for freshwater mussels within the South Branch of the Kishwaukee River Subwatershed (SB). Mussel surveys were performed at two sites within the SB, Russell Woods Forest Preserve and Sycamore Forest Preserve. A scale from 0 - 10 was created based on specific ecosystem requirements of each mussel species surveyed and each species was assigned a coefficient of conservatism value (C). The mean C value at Russell’s Woods Forest Preserve was 6.27 while the mean C value at Sycamore Forest Preserve was 6.66. Using relative abundance a weighted C value was calculated. Russell’s Woods Forest Preserve weighted C value was 3.62 and Sycamore Forest Preserve’s C value was 5.7.

Riparian Zone Widths within the Kishwaukee River Watershed
Presenter(s): Tryggve Vilaseca
Faculty Mentor(s): Scott Horlock, Biology
Session Time: 10:15-11:30AM; Poster:

Several studies have noted the impairment of water bodies due to encroaching farmland, including the diminishing biodiversity of streams. IC Valle et.al (2013) explored the influence of connectivity of riparian zone width on Rio de Janeiro’s stream macroinvertebrate biodiversity. Yuan Zhang et.al (2013) studied how the type of riparian zone land use affects the macroinvertebrate community. However, few studies that research the correlation between riparian zone width and macroinvertebrate biodiversity include streams with riparian zones with a width of fewer than 25 meters. Riparian zone widths for five streams within the East Branch of the South Branch of the Kishwaukee River Subwatershed were measured and compared to the modified biotic index of each stream. None of the streams had average riparian zone widths of greater than 80 feet (24.38 meters). A moderate correlation (0.497) was found between riparian zone width and the modified biotic index.
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