Celebrating student engagement at NIU

UNDERGRADUATE RESEARCH AND ARTISTRY DAY and COMMUNITY ENGAGEMENT SHOWCASE 2020

NORTHERN ILLINOIS UNIVERSITY
Office of Student Engagement and Experiential Learning
Letter from the Office of Student Engagement & Experiential Learning

Welcome to NIU’s 10th annual and 1st virtual Undergraduate Research and Artistry Day and Community Engagement Showcase! We could not imagine that we will be celebrating our 10-year anniversary by transforming our conference to the virtual format. We are incredibly proud of the work our students completed while navigating challenges of this unforeseen semester. From research on active singing and its effect on language and engagement of dementia patients to community engagement projects that shine light on local organization, Penguin Players, and their work to provide inclusive theatre, students have the ability to engage in hands-on meaningful activities that bring to life the world around them.

We believe NIU’s undergraduate research programs like Research Rookies, Student Engagement Fund, the Research, Engagement and Academic Diversity Grant and Community Engagement programs like Huskie Service Scholars and Huskie Alternative Breaks challenge students to define their passions, academic and professional goals, and ultimately their contributions to society.

Moreover, participating in the breadth of undergraduate research and community engagement opportunities at NIU can have a profound impact on a student’s academic and personal journey. It is our hope that students will explore these exciting programs and begin to realize their full potential while they move toward a degree at Northern Illinois University. Our goal through this event is to provide students with a venue to display their academic and community engagement work. We know you will be as impressed with the caliber of NIU’s undergraduate students as we are.

Michaela Holtz, Director

Destiny McDonald, Associate Director
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How to View Presentations

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  - PPT: You will need to “start slide show from beginning” in order to hear the audio. While some presentations will automatically begin the narration, some require that you press a playback button in order to hear the narration.
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AWARDS

- **URAD STEM**: Science, Technology, Engineering and Mathematics
- **URAD AEHHSS**: Arts, Education, Health, Humanities and Social Sciences
- **Community Engagement Showcase**
URAD / CES JUDGES

- Andrea Radasnu, University Honors
- Anna Forba, Counseling & Consultation Services
- Ariel Owens, Gender & Sexuality Resource Center
- Brandon Lagana, Planning & Assessment / NIU Undergraduate Studies
- Brett M. Feinstein, NIU Alumni
- Brian Berchtold, Office of the Vice Provost
- Catherine Ausland, Department of Biological Sciences
- Charles Achilles, NIU Alumni
- Christine Brovelli-O'Brien, NIU Outreach (STEM Read)
- Dee Anna Phares, University Libraries
- Donald Zinger, Department of Electrical Engineering
- Gwendolyn Glasner, NIU Alumni
- Harold Nii-Aponsah, College of Health & Human Sciences
- Jerrold Zar, Retired NIU Faculty
- Kate Cady, Center for the Study of Women, Gender and Sexuality
- Kay Caster, College of Education / External Programs
- Keri Asevedo, NIU Community Partner
- Kim Gatz, Department of Communication
- Larissa Garcia, University Libraries
- Leanne VandeCreek, University Libraries
- Marlo Barnett, NIU Alumni Board of Directors
- Mary Schlagel, Department of Environmental Health & Safety
- Masih Shokrani, School of Health Studies
- Matthew Werstler, School of Music
- Melissa Burlingame, Department of Environmental Studies
- Mike Verbic, Integrated Media Technologies
- Norman Walzer, Center for Governmental Studies
- Patty Wallace, Department of Psychology / Research & Innovation Partnerships
- Paul Priester, School of Interdisciplinary Health
- Peter Olson, NIU Art Museum
- Pi-Sui Hsu, Department of Educational Technology, Research and Assessment
- Rachel Rupnow, Department of Mathematical Sciences
- Sarah Cain, University Libraries
- Stephanie Kummerer, Center for Nonprofit & NGO Studies
- Tim Pierce, NIU Alumni
- Vidhya Sivakumar, NIU Alumni
- Wesley Swingley, Department of Biological Sciences
- Wieteke Holthuijzen, Department of Biological Sciences
- Yingwen Cheng, Department of Chemistry & Biochemistry
Title: Improving Bergstrom Zone 12 Layout Efficiency and Part Accessibility
Poster # 41
Presenters: Shae Alhusayni, Jacob Benedetto

Our project is studying Bergstrom Zone 12’s efficiency and part accessibility. Bergstrom Inc. is a company located in Rockford, IL that specializes in making heating, ventilation, and air conditioning units for vehicles ranging from mining equipment to school busses and semis. Our focus in this project is Zone 12, which specializes in assembling small water valves and controls that are shipped to customers or used throughout the plant. Due to product variation and poor zone orientation the zone has been experiencing low productivity, lack of consistency and excess motion. In this project, we are using various Industrial and System Engineering tools to investigate the current state of the process and the root of the problems by collecting and analyzing data to propose solutions. Our goal is to design a comparably better layout that addresses the inefficiencies and excess motion. In addition, we are proposing automation solutions to further reduce non-value-added and essential non-value-added activities.

Title: Improving Layout and Efficiency of Assembly Area
Poster # 43
Presenters: Chance Franckowiak, Kara Haas

Within industrial engineering, student teams are hand-picked to work on a company-sponsored project. Hoffer Plastics is sponsoring a project aimed to optimize one of their machines, which had an inefficient layout as well as high variation between processes from worker to worker. Using time and motion studies, data analysis, and 5S, we studied and analyzed the current state of the production area. Our recommendations are based on implementing lean tools like 5S+1 audits, layout improvements, and an analysis of ergonomics.

Title: Improving work order Visibility and trackability In the Materials Lab *HC
Poster # 44
Presenters: Munther Mahmud, Meshal Alrasheedi, Shobhit Deshlahra, Harsh Khatri

For our capstone project, our team was given a project by the company SKF. SKF is located in Elgin, IL and they produce products, solutions and services for rolling bearings, seals, services, and lubrication systems. The project’s scope is located in their material labs where they receive work orders to test compounds. The problem is that the material lab has no tracking or real-visibility of data. Some of the data collected is redundant and at times, inaccurate. This is due to the multiple unorganized data tools used throughout the labs. Continuously doing this will increase lead time, overwhelm workers, overuse the tools provided, and limit the departments from making continuous process improvement systems integration. Thus far, we have created a Value Stream Map (VSM) to show a visual representation of what is going on throughout the work order process. This VSM shows us the travel distances, timeline, operations, and communication of the current process. Our goal is to take this current process, eliminate the stated problems, and find solutions to improve the overall process.
Title: **Increasing Production Rate of Laminate Slitting Through Process Efficiency**  
Poster # 46  
Presenters: *Patrick Wasilewski, Manuel Delgado, Sai Vikas Maram, Jatin Kishore*  

For this project, a student team was assigned to a local manufacturer to demonstrate the engineering tools and skills being taught in the Industrial and Systems Engineering department at Northern Illinois University. The manufacturer, Nobelus, is a value-added re-seller of laminate rolls that is involved with processing master laminate rolls into custom orders. Nobelus currently has an average throughput of about 3,500 MSI/hour and would like to increase it to at least 10,000 MSI/hour on average, which Nobelus believes is achievable through addressing production bottlenecks. Nobelus measures laminate throughput in terms of MSI, where one MSI is 1000 Square Inches. The student team will investigate the production processes and determine areas for improvement as well as develop a current state of production for the company. The team will then formulate data-driven recommendations for Nobelus, provide the estimated benefits in terms of reduced costs or increases in throughput, and develop an initial plan for how these strategies should be implemented. Through implementing recommended strategies, the student team hope that Nobelus is able to make significant progress in reaching their throughput goal.

Title: **IoT Based Wearables: How Can We Avoid Sports Injuries Among Athletes?**  
Poster # 49  
Presenters: *Victoria Jeziorczak*  

When participating in sports it is not uncommon for an athlete to experience an injury, whether it is short-term or long-term. Technology today is consistently being built upon and new technological advances are discovered, such as the Internet of Things and wearable technology. Many current studies explore the use of wearable technology with respect to the maintenance of health, while beginning to introduce the application of the Internet of Things. The following research emphasizes these recently discovered uses of the Internet of Things and wearable sensors and how we can establish a connection between the two in order to create technology that can monitor and track the wellbeing of athletes. In doing this, we can reduce the occurrence of injuries in athletes so that they may continue to play at the best of their abilities.

Title: **Mechanical Optimization of Bouligand Nanoparticles**  
Poster # 60  
Presenters: *Scot Bishop*  

Organisms found in nature often exhibit mechanical properties and performance that exceed those of traditional engineering materials and structures. The dactyl club of the mantis shrimp is of particular interest due to its ability to withstand repeated, high impact compressive loading with minimal damage. It has been shown that the underlying Bouligand structure (a layer-by-layer structure with helicoidal rotation between layers) of chitin in the club is responsible for this behavior. From a bioinspired design perspective, it is of interest to assess if such mechanical performance could be achieved using a synthetic nanoparticle with a similar Bouligand structure. This work aims to determine what geometric and thermodynamic properties of this nanoparticle influence the resulting mechanical properties. Molecular dynamics simulations of a Bouligand structured nanoparticle subjected to compressive loading are performed. Using a chemistry-independent model, the effect of structural parameters such as pitch angle, interlayer interaction energy, and intralayer interaction energy on the ultimate stress, Young's modulus, and toughness of the system is investigated. The results show that the mechanical properties of such a nanoparticle are highly tunable, allowing the particle to be adapted for a wide range of applications. Changing pitch angle interaction energies are shown to effect ultimate stress and toughness. This work provides key insight into the Bouligand structure and establishes initial design guidelines for creating structured nanoparticles for future use as the filler phase in polymer nanocomposites.
Title: Assessment of Pre-Diabetes and Adult-Onset (type 2) Diabetes Awareness Among Representative Traditional College Students
Poster # 9
Presenters: Rebekah Gonzalez

Tens of millions of Americans have pre-diabetic mellitus (pre-DM) or type 2 diabetes mellitus (DM). More and more pre-DM or DM cases are seen in younger adults such as college students who are not aware of their disease conditions. The purpose of this project was to investigate the awareness of traditional college students of pre-DM and DM. Surveys were distributed to 199 undergraduate Northern Illinois University (NIU) students to evaluate their knowledge of pre-DM and DM. The surveys were distributed to various classes of freshman, sophomore, junior and senior classes of six colleges that offer undergraduate courses at NIU. Based on the exclusion criteria, 184 of 199 responses qualified for statistical analysis of this project. The result of the survey questionnaires showed that 66.3% of participants indicated that they had heard of pre-DM, and 99.5% indicated that they had heard of DM. Only 35.9% of respondents indicated that they had heard of A1c test, which is the gold standard for pre-DM and DM testing. In addition, 75% of participants indicated they had not been tested for pre-DM or DM. Based on the results of our survey questionnaires, we conclude that even though the majority of traditional, undergraduate students at NIU have some knowledge of pre-DM or DM, they are not aware of testing or have not been tested for pre-DM or DM. The results of this pilot project necessitate further investigation into pre-DM and DM awareness among university students in the future.

Title: Comparison of a Dissected Liver to a Diseased Liver
Poster # 16
Presenters: Joshua Anetekhai

The liver is an organ that is often looked over because it doesn’t do glorious jobs, such as pumping blood throughout the body like the heart does or taking in oxygen as the lungs do. But the liver is a necessity as some people like to enjoy an alcoholic beverage on the weekends and many people also rely on taking medications for their diabetes or hypertension. In both scenarios, the liver is responsible, the primary job of the liver is to filter the blood coming from the digestive tract before it passes onto the rest of the body. The liver also detoxifies chemicals and metabolizes drugs. Even though the liver is responsible for important functions in the body; the liver often receives a lot of neglect from the public. People rarely see the visual damage that can be done to their liver by overindulging with alcohol and drugs. This is why with the cadaver donated by the Northern Illinois university anatomy department; I will show how the liver can be affected by the abuse of drugs and alcohol and compare a dissected liver to a diseased liver.
Title: **Effects of coat protein mutations on the homologous recombination of the BMV RNA3**
Poster # 21
Presenters: *Kaitlin Miller*

This project looked at the effects of coat protein (CP) mutations on homologous recombination in RNA3 of the brome mosaic virus (BMV). Homologous recombination is conserved across all domains of life, viruses included, suggesting that recombination is a universal biological mechanism. Research of any kind can contribute to a better understanding of recombination in human cells. More specific to this project, by examining the relationship between CP mutations and recombination, the genetic diversity of viruses may be able to be better controlled. This means that the new strategies for developing effective and long lasting vaccines against viruses might be possible. This project was done by infecting Nicotiana benthamiana with RNA3 mutants, along with the wild type RNA1 and RNA2. Total RNA was extracted and the RNA3 was amplified using RNA3 specific primers. Finally, it was transformed into competent bacterial cells, ending with a colony PCR and RE analysis. Some goals of this project were to gain knowledge of molecular procedures completed in the lab, such as using a pipet, performing the RT-PCR, agarose gel electrophoresis, and bacterial cloning. The ultimate goal was to identify the recombination frequency of the homologous recombination in BMV RNA3 in relation to the CP mutations.

Title: **Establish Training and Resource Initiatives for Northern Illinois University’s Displaced Students** *HC*
Poster # 23
Presenters: *Oriana Flores*

Defining homelessness and displacement on college campuses. To develop initiatives to create a skeletal program for Northern Illinois University’s displaced student population and food insecurity. In addition, the initiatives will be used in the Student Assistant Center which is an emerging practice at Northern Illinois University. The purpose is to research what other universities and institutions are doing for their displaced students and how they are supportive. To develop a skeletal program, program initiatives, and best practices for NIU to follow. In addition, to establish training for faculty and staff on the issue of homelessness and to create a resource list for displaced students in DeKalb County. Lastly, to create protocols for students experiencing displacement and the necessary steps for best practices to impact functionality of the Student Assistant Center.

Title: **Huskie Alternative Breaks - Community Development in Grand Rapids, Michigan** *CES*
Poster # 38
Presenters: *Dioco Reyes, Emily Grobe*

12 participants travel to Grand Rapids, Michigan to participate in a Huskie Alternative Break. We partnered with Habitat for Humanity of Kent County to assist in Plaza Roosevelt, a neighborhood revitalization project that pursued to enhance education, health, and economic opportunities for residents in the Roosevelt Park neighborhood. Participants assisted in preparing single-family homes, building a community garden, and aiding a local church. Throughout the trip, students learned about Habitat Kent, Roosevelt Park, and the importance of community development. This trip was co-sponsored by the University Honors Program.
Title: **Impact of cradling bias on infant directed speech**  
Poster # 40  
Presenters: *Tiffany Jacob*  
   
The current study will explore whether the left-sided cradling bias observed in mothers of very young infants is related to infant directed speech. Five mothers will be asked to pick up their 4-month-old infants and place the infants down so we can see which side mothers use to cradle their infants. Mothers will be placed in two groups: left-sided cradling bias and non left-sided cradling bias. Mothers will be recorded as they talk to their infants. Average utterance length, the number of content words such as noun and verb placement at the end of sentences, and the number of different words (NDW) will be obtained and will be compared across and within mothers to determine if mothers who have a left-sided cradling bias also use more linguistic features of infant directed speech.

Title: **Improving Comfort and Reducing Pain During Labor**  
*HC*  
*ED*  
Poster # 42  
Presenters: *Anna Valentine*  
   
The pain that women experience during labor is specific to the individual and differs for each birthing mother. Pain during labor is affected by physiological and psychological factors and the intensity of the pain tends to vary greatly. The purpose of this literature review is to discuss the different pain management techniques available to laboring mothers and the importance of preparedness in childbirth on the effects of improving comfort and reducing pain. This paper consists of literature reviews from within the past five years, focusing on the different methods of pain intervention for childbirth. There are many methods to handling pain during childbirth, and those involved in the process should be well informed on the pharmacological and non-pharmacological interventions available. Having knowledge about each woman's different expectations during labor will allow the healthcare team to better prepare a woman for labor and delivery and help them to steer the woman toward a birthing experience that is right for them. While there have been many studies done to compare the effects of different pain interventions in laboring women, the best technique is still controversial and depends on the woman.

Title: **Music for Dementia: Does active singing maximize language and engagement?**  
Poster # 65  
Presenters: *Jasmine Robles*  
   
In this research project, we will be looking into whether active singing is beneficial for individuals with dementia. The goal is to add to the already existing research of how Music & Memory helps individuals with dementia by comparing it with active singing. There has been minimal research on comparing these two and with these findings, one can get a better understanding of dementia and what helps individuals who have dementia. We anticipate that compared to listening to music, active singing helps individuals with dementia more with their engagement, memory, and language. This research is essential to be able to learn more about treatments that aid in the daily lives of people with dementia.
Title: **Prevention of Burnout Syndrome in Nurses to Improve Patient Safety and Care** *H*
Poster # 74
Presenters: *Mallory Alton*

The purpose of this literature review is to identify strategies to prevent burnout syndrome in nurses in order to improve overall patient safety and care. Burnout syndrome can be defined as a physical, mental, and emotional state caused by chronic overwork and a sustained lack of job fulfillment and support. With prevention strategies identified, nurses can work to decrease work-associated stress and increase performance levels in order to achieve better patient outcomes. The shortage of available openings in nursing schools has led to a growing gap between the supply and demand for skilled nurses. Because of this, many hospitals and health care facilities are inundated with more work than they can handle. This overload of stressful situations in the workplace is ultimately what leads to burnout syndrome. The importance of this project is to recognize nursing as one of the most stressful occupations and implement strategies to manage work-associated stress. When stress is not a major factor, nurses are less likely to make mistakes on the job and therefore provide improved care while keeping patients safe. Although the way a stressful event is perceived depends on individual characteristics, resilience, and coping skills, interventions can be used to decrease overall stress levels in an individual. Types of interventions include stress management programs, communication skills training, professional identity development programs, changes in work environments, and teamwork development courses.

Title: **Radiation Risk**
Poster # 75
Presenters: *Lesia Kozych*

Cancer continues to be a growing concern for the entirety of the human population. During the diagnostic and treatment processes, certain devices are used in an effort to help the patient. However, imaging technologies used for screening patients such as the X Ray CT pose a risk to the patient. A safer device has been developed, called the Proton CT, but superiority to the current device still needs to be proven biologically. The purpose of this research is to show that the Proton CT causes less damage than the X Ray CT.

Title: **Romantic Relationship Formation Continuum** *ED*
Poster # 80
Presenters: *Rachel Evans, Katie Giever*

Young adults are building an unclear stage-like arrangement when forming healthy, committed romantic relationships. Using focus groups containing students from Northern Illinois University, researchers hope to clear the pathway that leads to committed relationships. The various stages consist of characteristics that make them more identifiable. Learning more about these stages and their characteristics will give researchers a chance to identify a clearer pathway to a healthy committed relationship. It is expected that participants will verify the unclear stage-like structure. Participants may discover that the pathway to a healthy committed relationship is very unclear and needs development.

*CES: Community Engagement Showcase, H: Honors Program, HC: Honors Capstone, ED: Equity/Diversity*
Title: **Strategies to Optimize Control of Opioid Overdoses in the Hospital and Community Settings** *H*
Poster # 88
Presenters: **Ariel Tate**

With our research, we will be examining balance and gait characteristics in children with autism spectrum disorder compared to children with other neurological disorders and those who are neurotypical. To accomplish this, we will be using the Zeno Walkway technology to assess different aspects of walking and balance in these children by having them stand on and walk across the mat. Additionally, we will play music for one of the walking trials to determine whether or not the music improves gait characteristics. I expect that the features of gait and balance in children with autism spectrum disorder will be more similar to children with related neurological conditions than those without. Furthermore, I expect to see an improvement in these elements when the music is playing. By deciphering which aspects of gait and balance, if any, are unique to autism spectrum disorder, we can get a better idea of what type of treatment and prevention methods could be most effective to improve the physical state of these individuals.

Title: **Students’ Responses Regarding Interdisciplinary Collaboration**
Poster # 89
Presenters: **Kaitlyn Sandoval**

Research indicates practitioners have increased job satisfaction and improved patient outcomes when participating in interdisciplinary teams. Providing students interprofessional education opportunities allows them to develop skills and core competencies that can make the transition to the work force more seamless. The purpose of this study was to assess student perceptions of an interdisciplinary case study event. Two hundred thirty-three students from seven disciplines submitted survey responses reflecting on the three things they learned from the event and how they will use the information and skills learned in their career. The participant responses were coded by six thematic categories. The participants provided insight on ways they will use interdisciplinary collaboration in their careers. Additionally, participants reported higher confidence in their own scope of practice. They had an increased desire to collaborate with other professions and gained knowledge of when and to whom one should refer. Students commented on the importance of a holistic approach through Interdisciplinary collaboration, and they gained more confidence to advocate for better patient care. This study indicates the case study event had an immediate impact on student learning regarding interprofessional collaboration.

Title: **Traffic-Related Injuries in Myanmar** *CES*
Poster # 109
Presenters: *Celine Taylor*

Traffic accidents are a growing public health concern in some low and middle income countries, which have seen a rapid expansion in personal vehicle use. There is a gap in knowledge regarding the risk factors of drivers that may contribute to traffic accidents in Myanmar. A needs assessment took place in Mandalay, Myanmar, during participation in a research workshop with local students and professors in 2019. A pilot survey was developed and tested using a free online and offline data collection and management software, Kobotoolbox. A new survey, expanded to include specific questions regarding knowledge, perception, and behaviors that could lead to accidents, will be administered over social media to collect a larger sample and deeper understanding of safety in Myanmar with a local team. During the needs assessment, unsafe behavior among drivers and passengers had been frequently observed. The survey is expected to show certain population groups (young, urban location) may show an increased rate of traffic accidents than others. Also, this study is going to demonstrate how knowledge, perception, and behavior can be linked to higher incidence of traffic accidents. Learning about the behavior of drivers including whether they use mobile phones while driving or wear protective equipment and safety devices such as helmets, seatbelts, and appropriate clothing will fill in the knowledge gap about traffic safety in Myanmar. This study will provide recommendations for local stakeholders to develop safety programs to further promote safe driving behavior, which can prevent traffic injuries.

Title: **Utilizing food and nutrition to create authentic mathematics learning**
Poster # 114
Presenters: *Jasmina Mesic*

Food and nutrition subject matter is an ideal context for creating authentic mathematics learning experiences. The FoodMASTER (FM) Initiative, a program that uses food as a tool to teach mathematics and science, has recently added authentic mathematics as a focus for teacher professional development (PD) activities. The purpose of this presentation will be to present the characteristics of authentic learning, discuss how food and nutrition provide an ideal context for authentic mathematics learning experiences, and to share FM authentic mathematics K-12 resources including a new resource called Food and You! Mathematics Matters. Educators will be able to use the FM authentic mathematics activities in most any learning environment and discuss the utility of authentic mathematics to create relevance for learners. Funding source: National Institutes of Health (NIH) Science Education Partnership Award (SEPA)
Title: “NIU, we have a problem,” a study investigating gross locomotor function in galactic space radiated mice
Poster # 69
Presenters: Rachel Einhaus, Chandré Roos
Galactic cosmic radiation may impair neurological functioning in astronauts traveling into deep space with the proposed mission to Mars. Exposure to galactic cosmic radiation may hinder performance in mission-critical tasks, such as performing ship maintenance. The rung-walking task, used to assess gross motor control, has identified deficits following cortical and subcortical damage. In the current study, mouse rung-walking behavior was assessed following exposure to acute or chronic simulated galactic cosmic radiation. Mouse performance was quantified by the time it took to completely walk across the rungs, limb contacts with the rungs, and limb slips through the rungs. Results are currently in the process of being analyzed. This research may elucidate the potential implications of galactic cosmic radiation on gross motor control. Future studies may benefit from this work in developing countermeasures to attenuate the effects of galactic cosmic radiation on gross motor control.

Title: An Examination of Postpartum Depression and its’ Effects on Child
Poster # 6
Presenters: Paige Eimen
Postpartum depression can be defined as depression that occurs during or after the birth of a child (American Psychiatric Association, 2017). Much of the research on this topic has focused on maternal health and well-being, however, less research has focused on child outcomes. The aim of this systematic review is to investigate possible outcomes and potential risks the child, ages 3 to twelve, may develop due to the mother having postpartum depression. A systematic review was conducted to review literature related to postpartum depression and child outcomes. A literature search was conducted and 481 articles from PubMed and 48 articles from PsycINFO were screened using predetermined search times and inclusion criteria, resulting in only six articles meeting criteria. Based on the six articles that met the criteria for this study, three studies focused on behavioral development, two studies focused on social emotional development, two studies focused language development, and one study focused on physical growth development. An implication of the current review is bringing awareness that postpartum depression not only impacts mothers, but it can also affect their child. One limitation of this study is the lack of diversity in age due to the oldest age being 5 years old. Future directions for this review is to conduct further research on children, aging from six to 12 years old, to see if they are potentially at risk due to the mother having postpartum depression.

Title: An Analysis on whether Brain Cancer is Gender Bias
Poster # 5
Presenters: Peter Challand
Cancer is a disease the affects millions of people around the world. Whether Male or Female this disease affects us both, however, who does it affect more? Certain cancers have greater or lesser effect on the opposite sex. For example, breast cancer affects women more than men and the opposite could be said for prostate cancer. Examining gender neutral cancers (cancers that aren’t gender specific) can tell us which populations (male or female) are at greater risk of getting cancer. To examine whether common gender-neutral cancers, like brain cancer for instance, has any bias towards one gender or another. A hypothesis test will be used (using the t-test) to determine whether there are any bias towards one gender or the other. The aim is to identify whether or not one gender is more at risk of getting Brain cancer than the other or if they are both at equal risk of getting cancer. Also Identify any reasons why one gender would be at more susceptible risk than the other.

CES: Community Engagement Showcase, H: Honors Program, HC: Honors Capstone, ED: Equity/Diversity
Title: Attachment of Microbes to LDPE Plastic Following Chemical Treatments
Poster # 10
Presenters: Pruthvish Patel, Graice Veronda, Diana Miguel

Over the last 50 years a drastic increase in plastic consumption has raised many environmental concerns. Plastic pollution is a global problem that impacts land, water, and air. Low density polyethylene (LDPE) is the most abundant plastic pollutant. It is used in films and packaging. When exposed to sunlight, LDPE can release methane, a potent greenhouse gas. So far, LDPE bags are extremely difficult to degrade by microbial action. Attachment of microbes to plastic is required for plastic degradation, but the plastic surface is hydrophobic (repels water). Oxidation of LDPE by chemical treatment can reduce the length of the polymers and may increase microbial attachment and degradation. Different chemical treatments were tested for increased oxidation of squares cut from a plastic bag. Plastic that was exposed to the most promising treatments was used in microbial attachment studies. Most of the microbes used in this study were able to degrade biopolymers. Some were closely related to organisms that changed the structure of plastic. Communities of microbes and individual microbes were grown under different conditions with plastic discs for two or more weeks. A violet dye was used to measure microbial attachment to plastic. Attachment ratios using plastic with different chemical treatments were then compared to each other. Favorable attachment was observed with the fungus Lecanicillium and with the bacteria Exiguobacterium Roc37, Deinococcus radiodurans and an environmental isolate of Streptomyces. Communities of microbes with enhanced attachment to LDPE were recovered from Galleria insect larvae and a rotted tree stump.

Title: Bioinformatic Analyses on Microbial Dark Matter NBK19
Poster # 11
Presenters: Kaelyn Nannini

Uncultivated but classified bacteria, also known as microbial dark matter, exist everywhere on Earth, but very little is known about their physiology and function. These bacteria are rapidly being sequenced and identified in a variety of environments throughout the world. This study focuses on a newly identified candidate division NBK19. Samples were obtained from marine environments in the North Atlantic and South Pacific oceans, individual cells were isolate, and then sequenced as six single amplified genomes (SAGs) by the Bigelow Laboratory for Ocean Sciences Single-Celled Genomic Center. Bioinformatic analyses were carried out to assess basic genomic information such as size and GC content, average nucleotide identity (ANI), average amino acid identity (AAI), estimated contamination and completeness, and the evolutionary relatedness of the SAGs. Findings show that the NBK19 SAGs form two distinct groups capable of the pentose phosphate pathway, glycolysis (including the Krebs cycle), gluconeogenesis, and most-likely assimilatory sulfate reduction.
Title: **Brand Reputations: How to Build and Maintain a Company’s Image**

Poster # 12

Presenters: Amy Geldean

In a world of new businesses constantly popping up, there is an important aspect to analyze: the creation and preservation of their brand reputation. The objective of this research is to recognize what it takes for companies to establish their brand reputation. There is more to creating a brand than just designing a logo. Successful businesses need to discover their purpose and what differentiate themselves from competitors. After companies have built their brand, they need to maintain it. This is where public relations and marketing comes in. After reviewing current literature along with interviewing professionals in the marketing and public relations field, it has been determined that these two areas work together to maintain a brand reputation. The techniques used by public relations and marketing specialists play a hand in developing a company’s image. It is crucial, however, for companies to recognize and understand the difference between public relations and marketing. From the marketing perspective, companies should focus on sales while from the public relations perspective, companies should focus on their communication with the public. This all relates back to the brand reputation because both promote the company image, just in different ways.

Title: **Can A Computer Score Students' Essays For Class?**

Poster # 13

Presenters: Madison Milburn, Mollie Partee, Darnisha Crockett, Christian Steciuch, Kyung Kim, Anne Britt, Keith Millis

Scientific explanations convey causes for a phenomenon (e.g. developing self-control). Understanding scientific explanations is not only crucial for STEM fields, but also supports decision making in the real world. It requires the student to mentally build a knowledge structure that captures how potential causes are connected to one another and to the outcome. Ideally, instructors would need to know the knowledge structure of their students in order to give them timely feedback on their understanding. This is a difficult goal to achieve in education. Currently, the most common way that educators evaluate student’s understanding of scientific explanations is multiple choice tests because they are easy to score. However, multiple choice tests may not test all of the connections in the explanations. Essay tests can potentially provide the instructor with the student’s knowledge structure, but essays are time-consuming to score accurately. A program called GIKS (Graphical Interface of Knowledge Structure) is a new method of measuring student’s organization of knowledge that does not require human scoring. This program provides instant feedback via a graphical representation of the students’ knowledge based on a submitted essay. In this project, we explored the accuracy of GIKS in identifying correct causal mechanisms and connections among causes from essays written by ninth grade students. We found significant positive correlations between GIKS’ and human scores on correctly identified causes and connections. We are currently exploring whether similar results would occur for college students reading psychology textbooks.
Title: **Characterizing efficacy of immunotherapy to promote axonal plasticity in a rodent model of Alzheimer’s Disease**  
Poster # 14  
Presenters: **Megan Lipton**  
Alzheimer’s Disease (AD) involves the progressive neurodegeneration of the septohippocampal cholinergic system. This neurodegeneration can be modeled by infusing 192-IgG-Saporin into the medial septum, thereby causing selective loss of cholinergic neurons that project to the hippocampus. Current therapeutic strategies have failed to promote neuroplasticity to treat AD. The anti-Nogo-A (11C7) immunotherapy has been shown to enhance axonal plasticity following stroke in rodents. This is the first study to examine the efficacy of 11C7 to enhance neuroplasticity of cholinergic axonal projections in a rodent model of AD. Histological analysis was conducted after extracting brains, including slicing tissue samples and staining slices for acetylcholinesterase to infer hippocampal cholinergic function. Microscopic photographs were taken and Image J was used to calculate optical densities in cortical and hippocampal brain regions. Data analysis for this study is ongoing. The results obtained from this study aim to provide a better understanding of the impact that 11C7 immunotherapy administration may have in promoting neuroplasticity following AD-related neurodegeneration.

Title: **Civil Warfare: Russian Foreign Policy Strategy in Eurasia**  
Poster # 15  
Presenters: **Robert Carolan**  
In the aftermath of NATO’s 2008 expansion into Eastern Europe, the Russian Federation has implemented a new foreign policy strategy based upon hybrid warfare. This strategy aspires to reorient Eurasia around a Russian nucleus of power, and incorporates traditional hard power and soft power tactics, including but not limited to, conventional military equipment, proxy paramilitaries, and above all, civil society. The combined sum of these tactics has destabilized the presence of western institutions in key European border countries, such as Ukraine and the Republic of Georgia, allowing the Russian Federation to prevent E.U or U.S. influence in the area, whilst promoting pro-Russian narratives, economic agreements, and military conventions. Drawing on ground experience in Russia, Ukraine, and Georgia—as well as expert knowledge from various academic journals and interviews, this paper will analyze this hard power — soft power strategy in Donbass, Ukraine and South Ossetia, Georgia. Each representing two distinct paths the Russian Federation establishes for “breakaway” regions – incorporation into the Russian Federation, or semi-autonomous statehood, and underlining new paradigms in Russian foreign policy.
Title: **Does silence mean yes?: A qualitative analysis of beliefs and behaviors surrounding sexual consent among students of color**

Poster # 19

Presenters: *Taylor Civilus, Cornelius Ingram, Kelsie Moosmann, Paul Blackmon, Kelly Vidovic, Maeve Wallace*

Conversations surrounding consent in sexual encounters are becoming common, especially on college campuses. Students are being taught the definition of affirmative consent—partners must say “yes” to all sexual intimacy in a sober, freely given manner. Despite great efforts to increase awareness and normalize affirmative consent, it is unclear that these messages are adopted in practice. In this study, undergraduate students of color participated in small focus groups in which they discussed their understanding of affirmative consent, consent-like behaviors, and perceptions of why there is a disconnect. They also provided cultural perspectives on the relationship between consent and sexual assault, including reasons for failing to report incidences. Preliminary analyses support findings from a recent interview study that did not focus on minority students. In both cases, participants reported recognizing affirmative consent and acknowledging the benefits of its use, but rarely reported engaging in it. Similar to past findings, students tend to endorse “no means no” and nonverbal consent practices to avoid embarrassment, reduce conflict, or not “ruin the mood”. Discussions about the role of consent behavior in sexual assault mostly focused on good decision making and safety awareness. In addition, evidence of victim-blaming suggests that people may lack an ability to imagine scenarios in which they could be vulnerable. The results will be discussed in terms of potential explanations for the disconnect between understanding and actions that was observed and the need to interrupt students’ assumptions about sexual intimacy.

Title: **Environmental Health of Coal Mining**

Poster # 22

Presenters: *Dayton Kimbark*

Coal is mined all around the world and is primarily used as an energy source. Despite coals usefulness in energy generation, it can negatively impact miners and the environment when burned. The objective of this study was to analyze harmful exposures that miners come into contact with including radioactive isotopes and air pollution in the form of PM 2.5 and PM 10 in the Magway coal mines located in Myanmar. Coal samples were collected and analyzed for ionizing radiation using a Sodium iodide detector. Particulate Matter (PM) levels were detected on the ground and inside the mine shaft using PM detectors. Levels of PM2.5 and PM10 on the ground were 0.4 µg/m3 and PM10 = 9 µg/m3, respectively. The average PM levels inside the shaft without a fresh air supply (PM2.5 = 90±70 µg/m3 and PM10 = 3,116±2,726 µg/m3) were much higher than the shaft with the fresh air supply (PM2.5 = 2±1 µg/m3 and PM10 = 8±2 µg/m3). The ionizing radiation dose based on coal samples was 3.6 µSv/hour. When miners were working below ground and didn’t have fresh air being pumped into the mine they encountered levels of PM 2.5 up to 4.5 times greater than the EPA’s standard of 35µg/m3. Miners were also exposed to PM10 pollution up to 38 times what is allowed based on the EPA guideline of 150µg/m3. Miners exposed to coal samples constantly are exposed to roughly 32mSv/year. This is greater than the International Commission on Radiological Protection dose limit of 20mSv/yr. In the future, further studies should be run to better understand the environmental health risks of coal mining.
Title: **Evolutionary Conflict and Coral Bleaching: What Doesn't Kill You Makes You Stronger** *ED*
Poster # 24

Presenters: **Meagan Paramo, Makena Paramo**

Corals have spent millions of years creating underwater communities with significant levels of biodiversity, but due to frequent coral bleaching, the fate of corals and these communities has become threatened. In order to gain insight into this ongoing coral ecological catastrophe with coral bleaching, octocorals have been developed as models in the laboratory. Using octocoral models, we examine how much reactive oxygen species (ROS) are produced by Sarcothelia sp., which contain Durusdinium sp. symbionts, and Sympodium sp., which contain Cladocopium sp. symbionts. We hypothesize that colonies of Sarcothelia sp. are rife with evolutionary conflict even under ambient conditions and hence produce high levels of ROS as a by-product of symbiont photosynthesis. On the other hand, colonies of Sympodium sp. more effectively mediate these evolutionary conflicts under ambient conditions and hence produce lower levels of ROS. Data obtained using the fluorescent probe 2',7'-dichlorodihydrofluorescein diacetate, which detects ROS, and fluorescent microscopy strongly support this hypothesis. Comparing colonies of these species simultaneously in vivo allowed us to examine the amount of ROS produced by each, so that more can be determined regarding the effect of evolutionary conflict on coral bleaching. This research is necessary as it measures ROS, which are central to coral bleaching, and the results may provide a general explanation as to why corals containing Durusdinium sp. symbionts are more resistant—what doesn’t kill you makes you stronger.

Title: **Gendering the Holocaust: How Gender and Sexuality Impacted the Victims and Perpetrators of the Holocaust** *HC*
Poster # 28

Presenters: **John Recktenwall**

From 1941-1945, the Nazi regime perpetrated one of the worst atrocities in recorded history. Approximately eleven million people would lose their lives, and a nation would be symbolically tried for these crimes at Nuremberg and the subsequent tribunals. Most of the defendants were men, but it is false to assume that the Holocaust was exclusively perpetrated by men. This project explores the atrocities committed by female perpetrators, as well as the experiences of female prisoners. Because of Germany’s feminization of homosexual men, their experiences are also included in this project. The concept of gender being a determining factor in the Holocaust has long been ignored, save for more recent scholarship on the topic. This project argues that gender and sexuality was a determining factor in the Holocaust, from the perspective of both perpetrator and victim, and that historians must take this into consideration when researching the autonomy and experiences of Holocaust participants.
Title: **Hate Speech Laws in Democratic States** *ED*
Poster # 32
Presenters: **Sean Lehning**

It is a commonly held belief in the American legal community that laws restricting expression on the grounds of derogatory or bigoted content ("hate speech laws") are prohibitively dangerous to free speech and by extension democracy. As such, this study seeks to provide more quantitative insight into this assumption by finding out how many democracies have hate speech laws and if they maintain a high degree of civil liberties. Using five indices of democracy and civil liberties (PolityIV, the Human Freedom Index, the World Press Freedom Index, the Freedom in the World Report, and the Democracy Index), I ranked the world's countries by their index scores to identify a top quartile. Then, using various databases and legal organizations (such as WIPO Lex and Article 19, respectively), I searched the constitutions and laws of the top quartile countries in each index for restrictions on hate speech. Overall, I identified 69 countries with hate speech laws, and on all indices, I found a majority of countries in the top quartile to have them. This indicates a "free speech absolutist" aversion to hate speech laws is uniquely American and demonstrates it's possible for healthy democracies to pursue more restrictive policies without as much harm as previously assumed.

Title: **How Mutation of alphaB-Crystallin Protein Affects its Structure and Aggregation**
Poster # 35
Presenters: **Jill Belluomini**

The human small heat shock protein alphaB-crystallin is found in the eye lens, brain, skeletal muscle, and cardiac muscle. Acting as a chaperone protein, alphaB-crystallin binds to partially denatured proteins in these tissues to prevent their aggregation. As a result, alphaB-crystallin serves as a biomarker for diseases associated with protein aggregation in these tissues, including cataract, Alexander’s, Alzheimer’s, Parkinson’s, and myopathy. Consequently, the R120G mutation of alphaB-crystallin is implicated in cataract and myopathy. However, alphaB-crystallin’s structure in water has not been fully determined due to its formation of oligomers containing varying numbers and spatial arrangements of monomers. Therefore, this study attempts to model computationally the structures of the alphaB-crystallin wild type and R120G mutation alpha-crystallin domain (ACD) dimers in water. Modeling the structures of the alphaB-crystallin dimers is conducted by performing molecular dynamics computer simulations using the computer program NAMD. Simulations of the dimers start from experimental X-ray diffraction studies of the protein’s solid-state structure. Structures simulated in water are then tested by calculating the resulting structure factors and comparing them with experimental small-angle X-ray scattering data. Currently, the structure factors of alphaB-crystallin’s wild type and R120G mutation ACD dimers simulated in water are being calculated, and it is expected that they will show differences due to different structures of the wild type and R120G mutation ACD dimer interfaces.

**CES: Community Engagement Showcase, H: Honors Program, HC: Honors Capstone, ED: Equity/Diversity**
Title: **How perceived similarity and mentor hypocrisy affects mentoring relationships?**
Poster # 36
Presenters: **Anjishnu Chakrabarti**

We have investigated how mentoring relationships are influenced by mentees’ perceived similarity to mentors and mentor hypocrisy (when mentor’s advice and behavior do not align). Our study was a replication and extension of a past research conducted by Thomas, Rogers, and Finkelstein (2019). Through a vignette-based design, we expect our results to indicate that encouragement and role-modeling have a strong positive relationship with mentee work-life balance satisfaction, while role-modeling alone has an influence on mentee job attitudes. This pertains to the replication component of the study. We also expect our research results to demonstrate stronger effects for mentees who perceived themselves as similar to their mentors. Additionally, we would expect our research results to indicate less trust in mentees who had a mentor whose advice and behavior did not align. We believe our research findings will help build a positive workplace culture, which will in turn cultivate healthy workplace relationships.

Title: **Inclusive Theatre** *CES*
Poster # 45
Presenters: **Melissa Munoz & Rebekah Gonzalez**

Penguin Players shines a light on the ability of individuals who have disabilities to be on stage and prove that they can do what they want despite the disability that they have. Penguin Players developed from Penguin Project, which is the same program with a younger age range of those who can participate. Penguin Players gives individuals over the age of twenty-one an opportunity to be included in theater and put on a show. There are about 12 artists who put on a show twice a year, and each artist pairs up with a mentor. Artists in our program are individuals with disabilities, and the mentors are those can assist with the learning of lines, songs, blocking, etc. Our main goal is to show audiences of all ages to focus on the individual’s ability and not their disability. We want to develop a stronger sense of inclusivity on and off-campus. As a team, we created an anonymous survey for mentors and the artist’s parents to complete. The benefit of the survey is to see how Penguin Players impacts the lives of an artist and mentor, and how we can make Penguin Players better.

Title: **Influence of Multitasking on Incivility: The Role of Personality**
Poster # 47
Presenters: **Isaan Brown, Sara Bahaji, Veronica LeRoy**

Working on more than one task at a time, or multitasking (Xie et al., 2019), has become commonplace in today’s technology-driven workplace. Because multitasking may defy certain social niceties, multitasking can be perceived negatively by coworkers, especially when the second task is done concurrently and is not relevant (De Bruin & Barber, 2019). If a task is irrelevant, multitaskers are perceived as more incompetent, cold, and rude. We extend this research by examining coworker perceptions of the actual behavior, focusing on perceived incivility. Workplace incivility is a behavior that is ambiguous in intent, but characteristically disrespectful and violates norms of respect (Andersson & Pearson, 1999). Based on evidence for the influence of personality on the way people perceive situations (Rauthmann, Sherman, Nave, & Funder, 2015), we hypothesize that certain personality traits are likely to shape how people perceive multitasking. Pulling from existing literature, we argue that agreeableness (one’s tendency to be receptive to others’ needs and flexible in social situations; McCrae & John, 1992), emotional stability (one’s propensity to be emotionally reactive to situations and perceive situations as negative; McCrae & John, 1992), and trait anger (one’s propensity to ascribe negative intentions to social situations and to react as such; De Bruin & Barber, 2019) will influence perceptions of incivility. We expect relevant (vs. irrelevant) multitasking will be perceived as less uncivil, and that this relationship will be moderated by emotional stability, agreeableness, and trait anger.
Title: **Intriguing or unsettling? How Dimensions of Curiosity Predict Reactions to Novelty** *H
Poster # 48
Presenters: **Justine Rivard**

This study examines factors that contribute to an individual’s reactions to unfamiliar phenomenon. Prior research has shown that novel and complex stimuli can trigger interest when individuals have the capacity to handle the complexity (Silvia, 2005). This study tests whether specific dimensions of curiosity (Kashdan, 2018) — a construct closely related to interest — will be related to reactions to visual stimuli. We hypothesize that those who value new experiences (i.e., reflecting joyous exploration curiosity) will respond more positively to an ambiguous image, and that those driven by more intellectual pursuits (i.e., reflecting deprivation sensitivity curiosity) would prefer more familiar stimuli. College student participants (N=38) viewed ambiguous and unambiguous images. After each, participants were presented with fifty-two word choices that had already been normed for positivity/negativity (Rocklage & Fazio, 2015). Participants selected four words that described the image, and then narrowed it to one. Participants then completed several curiosity scales. We will correlate participants scores on each dimension of curiosity with the valence associated with the word they chose to best describe each stimulus. We predict that participants who score highly in joyous exploration will rate ambiguous visual stimuli more positively than those low in joyous exploration. Additionally, we predict that participants that score highly in deprivation sensitivity will rate unambiguous visual stimuli more positively than those who score low in deprivation sensitivity.

Title: **Lake extraction and classification of Tibet area**
Poster # 52
Presenters: **Anran Zheng**

Based on the strm 30m DEM data, I realize the extraction of lakes and catchments in Tibet area in Arcmap. Also, I classify the lakes into different categories based on their locations: upstream lakes, inflow and outflow lakes, glacier-supplied lakes and non glacier-supplied lakes. Furthermore, I focused on the Nam co lake, a specified area in Tibet, and extract the lake from the Landsat data in ENVI by calculating the MNDWI index. I extract the lakes annually and then I can compare their changes according to the climate changes.

Title: **Latino Medal of Honor Recipients: From the US Civil War to the Present**
Poster # 53
Presenters: **Antonio Torres**

This research encompasses Hispanic Medal of Honor Recipients and their effect on today’s American society. From the American Civil War to the War on Terror, there have been 60 men of Hispanic heritage awarded the American military’s highest award, the Medal of Honor. I examined archival texts and data systems that built my case of the contributions of the recipients. I researched five soldiers awarded the medal from different theaters of war – Corporal Joseph H. De Castro of the Civil War, Private David Barkley of WWI, PFC Howard Gonsalves of World War II, MSG Roy Benavidez of the Vietnam War, and MSG Leroy Petry of the War in Afghanistan – to learn and reciprocate the stories of their acts of bravery that won them the medal. I thoroughly examined how the wars shaped them and how these men lived their lives before and after the military. The expectations are to bring honor to the overlooked men who fought to protect Americans domestically and abroad and to tell their stories to those willing to listen.

_CES:_ Community Engagement Showcase, _H:_ Honors Program, _HC:_ Honors Capstone, _ED:_ Equity/Diversity
Title: **Lava Tube Exploration on Mars Using SHARAD Radargrams and High-resolution Topographic Maps**
Poster # 57
Presenters: **Nolan Kutz**

Lava tubes on Mars have the ability to protect astronauts from solar radiation, meteoroid impacts, night/day temperature fluctuations, dust storms and other surface hazards. They may also harbor microbial life in a protected environment. Lava tubes on Mars are similar to terrestrial lava tubes, forming from cooled lava flows, but are longer and wider. This study combines high-resolution digital terrain models (DTMs) with SHARAD (SHAllow RADar sounder) data to identify and characterize lava tubes in the vicinity of Elysium Mons and Alba Mons (formerly Alba Patera). High-resolution DTMs are available from stereo pair images taken by the HiRISE camera onboard the Mars Reconnaissance Orbiter (MRO). These images provide elevation at a resolution of 1-2 meters per pixel with approximately 25 cm elevation accuracy. Topographic profiles across collapsed lava tube segments provide estimates of the lava tube dimensions. The MRO also deployed SHARAD, designed to image the upper 1 km of the Martian subsurface. SHARAD’s center frequency is 20 MHz with a 10 MHz bandwidth, emitting approximately 700 pulses per second. Estimated vertical resolution ranges from 8-15 m. Preliminary analysis of the SHARAD radargrams indicate numerous echoes in the vicinity of lava tubes, including diffractions. The shape and spacing of these diffractions may provide clues about the uncollapsed segments of these tubes, in a similar way in which caves below Earth’s surface are mapped using ground-penetrating radar.

Title: **Maternal Solutions Regarding Peer Victimization: Relations with Adolescent Anxiety**
Poster # 59
Presenters: **Sheila Tahernezhadi**

Past researchers have explored the impact of parents’ social coaching and found that suggestions such as “tell an adult” were predictive of adolescents’ coping responses (Tu et al., 2020). The current study further explores the “tell an adult” advice given by parents in regard to hypothetical bullying situations. Several questions were of interest: First, are there gender, age, or ethnic group differences in the use of the “tell an adult” solution with regard to bullying situations? Second, is the use of “tell an adult” related to three aspects of mothers’ reports of adolescents’ anxiety (overall, social interaction, and social phobia)? Third, is the relationship between “tell an adult” and adolescents’ anxiety moderated by adolescents’ gender? A sample (N=59) of mother-adolescent dyads (62.7% girls; m-age=12.46 years) was recruited to complete a series of questionnaires and video-recorded maternal-adolescent discussions of hypothetical bullying situations. Discussions were coded into categories of maternal advice (see Tu et al., 2020). No statistical differences were found for the “tell an adult” solution for adolescents’ ethnicity or gender. The correlation between the “tell and adult” solution and adolescents’ age was not significant; nor were there significant correlations between “tell an adult” solutions and three aspects of adolescents’ anxiety. Moderation analyses conducted in PROCESS (Hayes, 2019) suggested that there were significant interactions between “tell an adult” solutions and adolescents’ gender in predicting maternal reports of adolescents’ overall anxiety, social interaction anxiety, and social phobia.
Title: **Memphis: Civic Engagement** *CES*
Poster # 61
Presenters: *Riley McCabe, Hannah Thompson*

Hannah Thompson and I led a service-learning trip to Memphis, TN during the originally scheduled spring break. The trip was civic engagement themed and we did service focused specifically on the issues of food insecurity and homelessness.

Title: **Metacognition in Anatomy Labs**
Poster # 62
Presenters: *Emily Meegan*

Many students enroll in STEM-related programs but leave, unsuccessful. Researchers are investigating how curriculum contributes to keeping students in STEM-related programs. Figuring out how students are learning material for these classes can become crucial in fostering student success. Metacognition, the ability for one to control processing of new information as well as understanding one’s own knowledge, has been shown to positively affect student exam scores. Anatomy and physiology courses are a key foundation for many science-related careers. Our research evaluated if course-based metacognitive training (CBMT) in anatomy and physiology lab courses influences student outcomes. We used a quasi-experimental approach to compare lab sections that either received the metacognitive training or not and to compare between two different types of anatomy and physiology courses (i.e., model-based versus cadaver-based). We assessed metacognitive awareness of these students using a published instrument. Additionally, we assessed students for their performance on lab exams. Data from this experiment showed that post metacognition scores were significantly influenced by treatment but not course. Treatment also played a role in the differences between exam scores in both BIOS 311 and 357 courses. Students who received CBMT showed better exam performance compared to students who were in the control group. This information showcases that metacognitive training benefits anatomy and physiology students. Understanding the association between metacognitive skills and student performance can become influential in students' academic careers.

Title: **Molecular Calorimeters Based on Kinetic Hysteresis of DNA I-motif**
Poster # 63
Presenters: *Brant Kidd*

Calorimetry is the process of measuring the amount of heat released or absorbed during a chemical reaction. In biochemical fields, this is typically measured with Isothermal Titration Calorimetry which requires large sample sizes and cannot measure heat released inside cells. Therefore, our goal is to develop a sensor that can measure heat changes in small volumes, can be used inside cells, and is compatible with high throughput measurements. We base the new molecular sensor on a phenomenon of kinetic hysteresis. Particularly, we deliberately design molecules that unfold fast upon heat exposures but do not fold back when the heat is dissipated. As a result, the sensor can measure very small changes in heat with a good signal-to-background noise. For the sensor design, we use small synthetic oligonucleotide molecules that can reversibly fold into quadruplex structures and have high propensity towards kinetic hysteresis. To evaluate the conformational transitions in molecular calorimeters, we take advantage of UV-vis spectrometry and Fluorescence Resonance Energy Transfer. As a result of this work, we establish conditions for best performance of the molecular calorimeters and demonstrate their ability to detect small heats released in the system.
**Title:** Nutritional State of Insects that Help Control Pest Filth Flies  
**Poster # 71**  
**Presenters:** Riddhi Patel  

The larval stage of Spalangia cameroni Perkins (Hymenoptera: Pteromalidae) develop individually in filth fly pupae, which are found in decaying organic matter such as manure. After emergence, adult S. cameroni feed on sugar rich foods, such as nectar. Energy obtained from feeding is used for various metabolic processes, searching for food and hosts, and reproduction. Lipids also make up 30-40% of the dry weight of oocytes. Excess energy is often stored as glycogen (short-term) or lipids (long-term). Glycogen is a polymer of glucose subunits, whereas lipids are typically stored as triglycerides. Some energy is retained in adults from the host feeding during the larval stage. Most species of parasitoid wasps were thought to have lost their ability to produce lipids de novo (i.e lipogenesis), instead relying on reserves from their larval stage. However, recent evidence suggests that some species thought to lack lipogenesis can in fact produce lipids. The present study aimed to determine how the levels of lipids, glycogen, and total sugars in S. cameroni change over time when fed a sucrose solution compared to just water. Anthrone reagent was used for the colorimetric quantification of total sugars and glycogen, and vanillin reagent was used for the colorimetric quantification of lipids. Recently fed wasps are expected to show an increase in total sugar and glycogen. If an increase in lipid is seen, because the wasps lacked access to lipids in their diet, it would provide evidence that wasps undergo lipogenesis.

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**Title:** Optimization of DNA purification from the virus PBCV-1  
**Poster # 72**  
**Presenters:** Emily Jones, Pruthvish Patel  

Algae viruses may be useful as specific control agents for reducing harmful algal blooms. Viruses may also be used to reduce the cost of oil recovery from algae for production of biodiesel, which is a renewable fuel source. Many viruses have not yet been discovered or described. If virus DNA can be isolated, it can often be amplified using the polymerase chain reaction (PCR). In this study, quantitative real-time PCR (qPCR) was used to optimize DNA recovery from a well-studied virus of freshwater algae. In this system, PBCV-1 infects the NC64A strain of unicellular algae and causes the algae cells to lyse or break apart. This process can be seen using a plaque assay, where lysed algae appear as clear zones against a green background of intact, viable algae on an agar plate. Virus was recovered from these clear zones. The concentration of the virus by the methods of filtration and alum flocculation were investigated. The purity and the yield of viral DNA was determined by qPCR. This information enabled the optimization of DNA isolation for yield, and another DNA isolation was optimized for purity. DNA purification methods developed for PBCV-1 can be used for future studies of viruses recovered from environmental samples. In most cases, the natural hosts for viruses of algae are unknown. The methods described in this study can be used for future studies of uncultured viruses from different sources of water.
**Title:** Pharmacological Intervention and Environmental Enrichment Improve Negative Consequences of Stress  
**Poster # 73**  
**Presenters:** Thomas Miller

Our research in the Department of Psychology is focused on behavioral and neurobiological consequences of stress and exploring pharmacological and non-pharmacological treatments for its consequences. The present studies investigated whether sertraline (a common antidepressant drug) and environmental enrichment (a paradigm involving healthy stimulation of the brain from environmental changes) could alleviate the effects of social stress using the prairie vole model. Prairie voles are socially monogamous like humans, forming strong social bonds, and co-parenting their offspring. Therefore, they are good candidates for studying the disruption of social bonds. The first study examined the effects of sertraline following the disruption of social bonds in prairie voles. The study contained 23 male sibling pairs to which a sertraline or vehicle injection was administered daily for 20 days following social isolation. Sertraline did not protect against depression-relevant behaviors but may protect against the cardiovascular consequences of stressors such as improving heart rhythms and increasing parasympathetic actions. The second study compared the behavioral and cardiovascular effects of social isolation, repairing with a previous social partner, or enrichment on cardiovascular responses to social stress. The negative behavioral and cardiovascular consequences of social isolation were reversed using environmental enrichment and repairing. The studies demonstrate that social stress can be alleviated by both pharmacological and behavioral methods of treatment. This research can promote novel treatments for social stress in humans.

**Title:** Reactions to Human-Like Targets and the Role of Emotional Stability  
**Poster # 76**  
**Presenters:** Dwayne Matthiesen

This project tests the role of personality in how individuals perceive and evaluate other people. One personality variable, neuroticism, refers to individuals’ tendency to experience intense negative emotions. Prior research found that persons high in neuroticism experienced a more negative affective state than their stable counterparts, resulting in a tendency to view stimuli as unpleasant or threatening (Dauvier et al., 2018). This study examines individuals’ reactions to stimuli that are human-like, but not quite human, found to evoke an unsettling feeling overall (Carr et al., 2017). We hypothesize that those who score high in neuroticism will have an especially negative reaction to these stimuli, and less so for neutral stimuli. Introductory psychology students participated in a study during Fall 2019 and were assessed for five factors of personality that included neuroticism. Volunteers viewed computer images that included neutral stimuli and those that appeared human-like (but not quite). Participants then selected one response from among 52 emotive words with pre-assigned values related to extremity of emotion. Analysis will focus on the correlation between neuroticism and extremity of word choice in response to the human-like stimuli compared with the neutral stimuli. If our hypothesis is supported, people who scored higher in neuroticism will use words reflecting more extreme negativity compared to their stable counterparts.
Title: **Remembering the Fallen: How Illinoisans Commemorated the Civil War, 1865-1929**
Poster # 79
Presenters: Jeremiah Knoll

In the decades between the end of the Civil War and the Great Depression, local governments, veterans’ groups, and charitable organizations dedicated dozens of Civil War monuments throughout Illinois. This research project examines what led various groups to build these monuments and how they expressed their thoughts on the war through commemoration. After examining contemporary newspaper accounts and dedicatory addresses, I found that the people and motivations involved in building these monuments changed over time. During Reconstruction (1865-1877), while the South continued to be occupied by federal troops, the local organizations who built the first monuments often condemned the Confederacy for causing the war. From the end of Reconstruction until the Spanish-American War in 1898, commemoration was dominated by veterans’ groups who sought to reunite the nation and inspire younger generations to do their civic duties. The final time period began with the Spanish-American War and continued to the beginning of the Great Depression, as scholars have argued that American involvement in foreign wars helped to reconcile the North and South. The declining number of veterans led to greater involvement for women’s organizations, and commemoration focused on promoting both reconciliation and Progressive ideals. The changing nature of Civil War commemoration in Illinois demonstrates that while Illinoisans have always desired to remember and memorialize the soldiers they had lost during the war, the meaning of the war and how it is remembered has changed as different generations take on the task of memorializing the fallen.

Title: **Scrupulosity and Perceived Immorality: An Investigation into Religious Participants and Immoral Behavior**
Poster # 81
Presenters: Stephanie Provis, Dylan Pencakowski

Scrupulosity is a subtype of Obsessive-Compulsive Disorder symptoms consisting of persistent, repetitive doubts about committing sin and performance of rigid, compensatory behaviors (Abramowitz et al., 2002). The purpose of the current study was to investigate if scrupulosity among moderately religious participants predicts whether participants rate a morally-questionable lab-based task as immoral. It was hypothesized that scrupulosity symptoms would positively predict perceived moral wrongness. The sample (N = 99; Mage = 19.2 years) consisted of Protestant Christians (49% Black, 37% White, 5% Asian, 5% multiracial, and 3% “other”) from undergraduate introductory psychology courses. The study used a strength of religious faith questionnaire (SCSRQ; Plante & Boccaccini, 1997) to assess religiosity, and the Penn Inventory of Scrupulosity (PIOS; Abramowitz et al. 2002) to assess scrupulosity. Participants completed the Sentence Task (Rachman et al., 1996) in which they are asked to write “I hope ___ is in a car accident,” inserting the name of a loved one. Moral wrongness for writing the sentence was assessed using a 0-100 Verbal Analogue Scale (VAS). To test our hypothesis, we ran a regression analysis to investigate whether participants’ PIOS scores would predict post-Sentence Task VAS moral wrongness rating. The PIOS did not significantly predict moral wrongness (F(1,97) = 1.669; p = .199, b = .13, R2 = .017). Participant scrupulosity did not significantly predict perceived moral wrongness of completing the Sentence Task. It is possible that participants experienced a sense of diffused responsibility for their thoughts.
Title: **Shakespeare and the Law**  
Poster # 82  
Presenters: *Catherine Carter*  

Shakespeare’s plays often involve legal systems, and comedic legal justice occurs most conspicuously and controversially in *The Merchant of Venice*. Studies of legal context for the play have focused on different branches of English law during Shakespeare’s lifetime. My project inquires further: to what degree did Shakespeare know about Venetian law and consider it when inventing this comedy? For this project, I focused on Venetian law because I wanted to see how that might have affected the characters’ actions. I then compared the relevance of English law from that time, since Shakespeare was writing about Venice while he was in England. Scholars have analyzed how English law has affected the context of *The Merchant of Venice*, and I am adding to the debate by analyzing how, if at all, Venetian law has affected the play. Most scholarship focuses on English law in relation to Act 4, Scene 1 of *The Merchant of Venice*; I am looking to focus my study on Venetian law in Act 4, Scene 1 as well. During this scene, Portia masquerades as a judge for the sentencing portion of Antonio’s trial. She uses her command of the law to challenge the plaintiff’s claim. I concentrate my analysis on how Venetian law affects her actions during the trial and the conclusion of the play. By analyzing Venetian and English law, I am better able to understand how the use of both legal systems aid the plot of *The Merchant of Venice*.

Title: **Simulating the Structure of Aquaporin-0, A Protein Implicated in Cataracts**  
Poster # 83  
Presenters: *Kimberly Sims*  

Aquaporin-0 is a membrane protein found in the eye cells that regulates water pressure by transporting water in and out of the cells. Mutations result in misfolding of the protein, which makes the protein opaque, causing cataracts. The objective has been to study the foundational structure of aquaporin-0 and, more recently, the porosity of aquaporin-0. The structure of monomer aquaporin-0 has been simulated using Molecular Dynamics, using the programs VMD and NAMD to calculate the structure factor. Structure factors have been calculated of the protein both with a 20Å box of water and a 7Å shell of water, and notable differences in the intensities of peaks are present in the structure factor of the 7Å shell. Through the use of Lorch functions, the objective is to determine whether or not these peaks are artificial. Looking ahead, the tetramer aquaporin-0 will be solvated and simulated. Then the porosity of aquaporin-0 will be studied by measuring the porosity of the middle pore where the four monomers meet.

Title: **State of the Nonprofit Sector in Aurora**  
*CES*  
Poster # 87  
Presenters: *Riley McCabe*  

For this project, I worked with Dr. Alicia Schatteman to do an exploratory study on the state of the nonprofit sector in Aurora. We worked with Thrive Collaborative Center in Aurora and hope that this research supplements their efforts to support nonprofit organizations and social entrepreneurs.
Title: **Small-Mammal Response to Moonlight in Restored Tallgrass Prairie**  
Poster # 84  
Presenter: **Nora Schofield**

Small mammals play an important role in prairies by eating and dispersing seeds of native plants. Most small mammals are nocturnal, and moonlight can suppress small-mammal activity by increasing predation risk, but this has not previously been investigated in prairies. We hypothesized that moonlight will suppress nocturnal activity of three common small-mammal species (Peromyscus maniculatus, Peromyscus leucopus, and Microtus ochrogaster). We tested this hypothesis using small-mammal trapping data from Nachusa Grasslands, a restored tallgrass prairies in Franklin Grove, IL, from 2013 – 2019 and determined the moon phase during each night of trapping. Moonlight impact on nighttime activity varied by species. P. maniculatus, the most common species, was less active on nights with bright moonlight, while P. leucopus was more active during bright moons. This suggests that moonlight might affect competition between small mammal species for resources such as seeds.

Title: **Space Rat Force: Effects of Galactic Cosmic Rays on Gross Motor Control in Rats**  
Poster # 85  
Presenter: **Brianne Maksimovic**

Galactic cosmic radiation encountered during deep space missions may affect motor function of astronauts. Few studies have investigated the effects of galactic cosmic radiation on gross motor control which is essential to astronauts carrying out specific tasks in space. The rung walking task evaluates gross motor control in rats crossing a series of randomly spaced rungs that prevent motor learning. Gross motor deficits have been revealed in the rung walking task following rodent models of stroke and spinal cord injury. The present study investigated rat rung walking behavior following a single exposure to 5cGy Silicon, a component of galactic cosmic radiation. Rung walking behavior was characterized by time to cross the rungs and the type of limb contact or limb slip: normal contact, no grasp, shallow slip, and deep slip. Data analysis is ongoing and results will be given at the time of the poster presentation. This work may guide future research on minimizing the potential harmful effects of galactic cosmic radiation on gross motor control.

Title: **Synthesis of Boronic-acid Derivatives of Serine for BNCT**  
Poster # 90  
Presenter: **Caroline Rosenquist**

Boron Neutron Capture Therapy (BNCT) is a radiation science that is emerging as a possible tool in treating cancer by selectively concentrating boron compounds in tumor cells and then subjecting the tumor cells to epithermal neutron beam radiation. Due to the frequent ineffective treatment using traditional radiation and chemotherapy, this is an essential and potentially life-saving research subject. Most recently, BSH (sodium borocaptate) and BPA (boronophenylalanine) have been studied substantially for use in BNCT, but with low therapeutic efficacy. To attempt to improve upon these existing methods, we have been researching the synthesis of boronic-acid derivatives of serine. Boronic-acids have a very similar structure to BSH and BPA but with lower toxicity to patients and potentially higher uptake within cancer cells. Substituted within serine, a naturally-occurring amino acid in the body, this could be a more effective compound for BNCT.
Title: Synthesis, Structure, and Optical Properties of Eu and Yb Metal Organic Framework Functional Materials
Poster # 91
Presenters: Alyssa Mohr

The synthesis of metal organic framework (MOF) functional materials capable of selectively absorbing and detecting chemicals such as toxins, pollutants, and explosives will enable increased screening and security in various settings. The successful synthesis of $[\text{Eu(NO}_3\text{)(NDC)}\cdot2\text{DMA}]_n$ and $[\text{Yb(NO}_3\text{)(NDC)}\cdot2\text{DMA}]_n$, which both contain large pore sizes theoretically capable of absorbing such chemicals, introduces the idea of lanthanide MOFs. Using infrared spectroscopy (IR), it was determined that the ligand (NDC) is not present in either of the MOF samples. It was further confirmed that pure MOFs were synthesized by using a powder X-ray diffractometer (PXRD) to compare theoretical to experimental patterns. Quenching studies were then performed to determine how the fluorescence changes with the absorption of various chemicals, including metal ion quenchers (Co$^{2+}$, Cr$^{6+}$, Cu$^{2+}$, Fe$^{2+}$, Mn$^{2+}$, and Ni$^{2+}$) and organic quenchers (benzene, o-phenanthroline, pyridine, pyrrole, and toluene). Fluorescence measurements taken for the Eu MOF in methanol, excited at 300 nm, produced significantly less intense peaks for all metal ion quenchers as well as o-phenanthroline. Furthermore, fluorescence measurements taken for the Yb MOF, excited at 295.5 nm, produced significantly less intense peaks for Cr$^{6+}$, Cu$^{2+}$, Fe$^{2+}$, Mn$^{2+}$, and o-phenanthroline. Therefore, both $[\text{Eu(NO}_3\text{)(NDC)}\cdot2\text{DMA}]_n$ and $[\text{Yb(NO}_3\text{)(NDC)}\cdot2\text{DMA}]_n$ are effective and selective chemical sensors for metal ions and organic compounds as indicated by our quenching studies.

Title: The Concept of Moral Dilemmas in Ethical Philosophy
Poster # 94
Presenters: Anna Pesola

Moral dilemmas, or ethical dilemmas, are often discussed in the philosophy of ethics. A moral dilemma is a decision-making problem that involves conflicting obligations where the agent is required to satisfy one of the obligations but is unable to satisfy all of them. Neither obligation is preferable as they each hold the same ethical implications. Since moral dilemmas occur in the lives of many individuals, it is important to understand just what a moral dilemma is and how it can affect one’s life. Some ethicists believe moral dilemmas are a possibility, while others believe there is always something else that can be done to narrow the options, resulting in a dilemma not occurring. In this paper, I address the concept of a moral dilemma and the differing views that ethicists take when discussing these ethical dilemmas to conclude what argumentative stance one ought to take. To accomplish this, I will discuss examples and the work and moral theories of different philosophers such as Immanuel Kant, Simon Blackburn, Jean-Paul Sartre, Peter Railton, and Thomas Hill, Junior. After clarifying the views of these philosophers, I will respond to and critique their positions against a differing point of view to make sure the broad spectrum of this topic is covered and understood to the best of my ability.
Title: **The Effect of Metformin and Sorafenib on ASCT2 Knockout Hepatocellular Carcinoma Cell Growth**
Poster # 95
Presenters: Isabella Guizzetti

The CRISPER Cas-9 system is a widely-used gene editing system that can be used to knock out target genes and eliminate their functional expression. It is thought that CRISPR-Cas9 edits are permanent, and that knocked out genes will not reappear in edited cell populations. In human cancer cells, ASCT2 is a glutamine transporter that is frequently enhanced, and has therefore been investigated as a targeted therapy in oncology. Our lab previously used the CRISPR Cas-9 system to knock out expression of the ASCT2 transporter in two human hepatocellular carcinoma (HCC) cancer cell lines, Huh7 and SK-Hep1, which were then grown out on a large plate for clonal isolation. This process allowed us to isolate individual populations of each cell line that could be screened to determine if still expressed ASCT2. Once this process was complete, Cell lines that were known to be completely knocked out for ASCT2, a parental cell line, and a nonsense control cell line for both Huh7 and SK-Hep were analyzed using an MTT assay to measure cell growth under four different conditions. Normal media acted as a control for the media containing Metformin, which is commonly used to treat Type 2 Diabetes but has been found to act as a tumor suppressor. Media containing DMSO acted as a control for media containing Sorafenib, which is currently the only FDA approved chemotherapy drug for treating hepatocellular carcinoma. Results suggested that SK-Hep was less vulnerable to Metformin than Sorafenib, with the clonal population being the least vulnerable. Huh7 was relatively vulnerable to both, and the clonal knockout was the most vulnerable to treatment.

Title: **The Effects of Child ADHD Symptoms and Parental Stress on Parental Self-Efficacy**
Poster # 97
Presenters: Ashlyn Thurman, Lynn Kang, Maria Medrano

Parental self-efficacy is defined as the parent’s belief that they are a competent parent and capable of effectively managing child problems (Coleman & Karraker, 1997). Another form of parental self-efficacy defines the parent’s belief that they are capable of supporting their child’s educational activities (Ogg et al., under review). Two key predictors of self-efficacy include parental stress and child symptoms associated with ADHD: inattention and hyperactivity/impulsivity. Previous research has found parental self-efficacy in parent involvement, parenting of children with ADHD, and educational activities to negatively correlate with an increase in symptom severity (Rogers et al., 2009; Maniadaki et al., 2005, 2006; Ogg et al., under review). Research has also found parents report lower general self-efficacy when facing stressful experiences, and decreased parental self-efficacy was found when parents report higher levels of stress toward difficult parenting situations (Jackson, 2000; Schulz, 2019). These findings suggest associations may be found between parental stress, self-efficacy, and child ADHD symptoms. Increased child symptom severity and stressful situations, as perceived by the parents, could be a key predictor of multiple forms of self-efficacy in parents. We hypothesize child ADHD symptoms and stressful events will be a strong predictor of parental self-efficacy for educational activities. Data were collected daily for 14 days among a sample of mother-child dyads of children with elevated symptoms of ADHD (n = 26). The hypothesis will be assessed utilizing a regression analysis and results will be discussed.
Title: The Evolution of Korean Costume: Urban Korean Women’s Shift From Traditional to Western Clothing in Colonial Korea, 1910-1945 *HC
Poster # 100
Presenters: Keeley Shoudel

This project is about the fashion shift urban Korean women made from the traditional hanbok (한복) to Western-style clothing in the colonial period (1910-1945). I argue that urban Korean women shifted their fashion from traditional hanbok (한복) to Western-style clothing because of American missionaries and internal social changes rather than influences from Japan. For this project, I looked at translated primary sources, as I do not read Korean. These sources include magazine articles, cartoons, pictures, interviews with Korean women who were in colonial Korea at some point in their life, and missionary books that were written about colonial Korea. In addition to these, I looked at secondary sources that dealt with Japanese influence, American missionaries, and internal social changes. This project is significant because understanding a population’s fashion and the changes it undergoes can give us insight into their lives and how they felt about certain topics like religion, politics, and new ideas, which are all discussed in this paper. This project also highlights the significance of learning about the history of women, a subject that is too many times dismissed, belittled, and ignored.

Title: The G-protein signaling Rcp controls the polarized basement membrane deposition in epithelial cells
Poster # 103
Presenters: Trent Davids

Epithelial cells play important roles in the development and physiology of the human body, a key component of epithelial functionality is the establishment of apical-basal polarity (ABP) within the cells. A major component of the ABP is the basement membrane (BM), a mesh-like extracellular matrix of proteins that anchors epithelial cells and establishes the basal pole of the cell. BM proteins are specifically secreted basally by the epithelial cells. Despite its important roles, the overall mechanisms for the polarized deposition of the BM are currently poorly known. To study BM deposition we use the follicular epithelium (FE) of Drosophila melanogaster as a model system. In a genetic screen looking for new genes involved in the proper placement of BM proteins, we identified a new gene Rcp (Receptor component protein) involved in G-protein signaling. The loss of Rcp leads to the improper deposition of BM proteins at the apical side of the FE, and defects in epithelial architecture. Additionally, the knockdown of Rcp in the FE also leads to a strong apical accumulation of BM proteins supporting the role of Rcp in the proper placement of BM proteins. Interestingly, Rcp is the first component of a signaling pathway that has been implicated in BM polarity. We will describe the different approaches that we are undertaking to understand how Rcp controls the basal deposition of BM proteins in a polarized epithelium.
Title: The Role of Mentoring Support Following High Potential Designation
Poster # 106
Presenters: Maddison Burge, Vicente Carbajal

Organizations invest a lot of resources in identifying and developing high potential employees (HiPos; Devries, 2013) as they are believed to have the potential to be successful in future upper-level positions (Finkelstein, Goodwin, & Costanza, 2018). The investments made by the organizations are beneficial to the employees. For example, Khoreva and van Zalk (2016) found that HiPos who participated in leadership development activities had more work engagement. However, little is known about the impact of mentoring on HiPos. Mentoring is a helpful resource for employees as it can lead to increased socialization and decreased role stress and burnout (Thomas & Lankau, 2009). We examined the relationship between HiPos, mentoring, and burnout which is a state of mental, emotional, and physical exhaustion in employees (Maslach, Schaufeli, & Leiter, 2001). The researchers hypothesized that HiPos who received mentorship would experience less anticipated burnout than those who did not receive mentorship. To test the hypothesis, participants were recruited from the social media networks of the researchers and upper-level psychology courses at Northern Illinois University. Participants were led to believe that their level of potential would be determined in the study. After completing filler measures, all participants were told that they were high potential. Participants were then randomly assigned to complete a writing exercise created by a mentoring expert (mentoring condition) or to complete more filler questions (control condition). Afterward, the participant’s level of anticipated burnout was measured.

Title: Transparency in Science – Reporting Gene Research to the Scientific Community
Poster # 111
Presenters: Kelly Sueter

Being transparent with research data is crucial in the scientific community. Transparency gives the project credibility and ensures that the researcher is giving access to all aspects of a project, as well as making data public for other uses. The National Center for Biotechnology Information, or NCBI for short, is one of the largest informational hubs for this scientific material. It offers convenience in sharing and accessing information and ensures accurate results by the use of its own verification system to confirm results. Submitting genomic data to NCBI requires a lot of background work. This background work includes finishing the building of the complete genome by bridging all gaps between contiguous sequences, making sure that the genes are positioned correctly within the sequence by using a closely related reference species and annotating certain aspects in the genome, such as the inverted repeats. When all of this is completed, one may begin the process of submitting by using NCBI’s “BankIt”, which will take some specific information and then either accept the data by giving a submission number or reject the data and flag certain areas that need improvement.

Title: Trophic position and dietary carbon sources of invasive mice
Poster # 112
Presenters: Kaylee Rosenberger

Invasive species on islands are the leading causes of extinctions. Midway Atoll National Wildlife Refuge, an isolated system of islands in the Northwestern Hawaiian islands, houses the world’s largest albatross community. We are interested in studying this island because invasive mice have recently begun attacking nesting albatross. In order to preserve the albatross population and the historical nesting site, mice are planned to be eradicated summer 2020. However, the implications of the eradication are largely unknown, as the diet of invasive island mice has not been studied in great detail. In order to more accurately predict the trophic shifts following the eradication, we analyzed the broad diet of mice using stable isotope analysis. Stable isotopes provide a general look into the diet of an organism over time; therefore, we can predict how the ecosystem will shift after mice are eradicated, directing future island conservation studies and efforts.
**Title: U Can't Touch This: Examining the Effects of 11C7 anti-Nogo-A Immunotherapy on Restoring Temporal Processing in Rat Food Protection Behavior**

Poster # 113  
Presenters: Heyji Yang, Sabrina Pietrucha  

As the population ages, Alzheimer’s disease (AD) will continue to grow as a major health concern. AD is marked by a loss of cholinergic fibers that project to the hippocampus and cortex; as of yet, no therapies have been developed to attenuate this loss of fibers. This pathology can be modeled in rats by infusing immunotoxin 192 IgG-saporin into the rat medial septum; thereby, significantly reducing cholinergic projections to the hippocampus. Anti-Nogo-A immunotherapy has been shown to increase axonal plasticity after spinal cord injury and stroke. The current study evaluated the effects of 11C7 anti-Nogo-A immunotherapy on temporal processing deficits observed in rat food protection behavior following septohippocampal cholinergic lesion. Typically, rats engage in dodges when the perceived time to eat is longer early in the trial which transitions to braces as the perceived time to eat shortens; however, this transition is disrupted with septohippocampal cholinergic lesion. The data is currently being analyzed and will be reported at the time of the meeting. This work may elucidate the efficacy of 11C7 anti-Nogo-A immunotherapy in restoring cognitive function following septohippocampal cholinergic deafferentation. Moreover, in terms of behavior, the findings from this study may be a foundation of treatment for AD.

**Title: What Factors are Associated with Teen Birth in Illinois? *ED**

Poster # 116  
Presenters: Ziqi Liu  

Adolescent pregnancy is a common problem around the world. Giving birth at a young age can lead to emotional, social, and financial problems for the parents, children, and their families. In the state of Illinois, the average teen birth rate was 9.6% (IDPH, 2009). It is important to examine what factors are closely associated with teen birth. Findings from this line of research could provide policy makers with useful information to identify effective policies that address adolescent pregnancy.

**Title: When Justice Fails**

Poster # 117  
Presenters: Brittany Brown  

This project examines wrongful convictions in the Chicago, IL area. It focuses on the various factors that lead to this occurrence at the inter-personal and institutional levels. From the inter-personal level, there are many players within the criminal justice system—such as judges, prosecutors, and detectives—that can work (either intentionally or unintentionally) to put innocent people behind bars. Institutionally, laws and procedures can sometimes function to prevent the truth from being exposed. We examine the possible dysfunctions that might exist within and between the inter-personal and institutional levels. We focus primarily on the personal experiences of individuals who have been wrongfully convicted of serious crimes in Chicago area courts over the last several decades. The perceptions of personal and structural aggrievement that we expect to uncover highlights how individuals understand—and can come to resent—the criminal justice system of the United States.

**CES: Community Engagement Showcase, H: Honors Program, HC: Honors Capstone, ED: Equity/Diversity**
Title: Working in Animal Welfare
Poster # 121
Presenters: Sammie Musielak

Animal Welfare is interdisciplinary, an issue that crosses multiple disciplines, and in recent years has increased in popularity between social scientists, particularly sociologists. We seek to examine trends from a sociological perspective within the animal welfare community, by using survey data collected from staff and volunteers working in animal shelters, animal control centers, animal rescues and veterinary clinics in Illinois. By analyzing the data within the survey and comparing the results to recent research studies, we can conclude that working in animal welfare is difficult and more time consuming than what most would expect. Most involve themselves in the animal welfare field as a worker or volunteer out of a true love for and calling to help animals. However, research suggests that successful work with animals, whether paid or volunteer, requires strong skills such as self-efficacy, work life balance, resilience and coping strategies. From a sociological perspective it is important to raise awareness on how workers and volunteers in the field deal with stressful and in some cases risk-filled situations for themselves and the animals they are helping.
Title: An Analysis on Whether an Accounting Background Lays the Foundation for a Successful Transition into Law School *H
Poster # 4
Presenters: Christopher Chimienti

The purpose of this paper is to find out how exactly an undergraduate degree in accountancy will help in the study of law. To accomplish this, the paper looks at the course curriculum of a Northern Illinois University Accountancy major and the first year required courses in three Law Schools of varying rankings. Then, the skills and knowledge taught in each curriculum will be compared to see if there is any overlap. To supplement this analysis, I will host interviews with professional lawyers and law teachers who will give descriptions of the skills needed in everyday work. In addition to this analysis, the skills necessary for the LSAT exam and several fields of law will be discussed, and any potential overlap between the NIU Accountancy curriculum and the exam or fields will be explored.

Title: Governance Issues in Nonprofit Organizations – An Exploratory Study *HC
Poster # 30
Presenters: Julia Meyer

For my senior capstone project, I decided to conduct an exploratory study into the governance aspects of nonprofit organizations. Specifically, I was interested in nonprofit boards of directors and how different factors influenced board makeup. Some of the factors explored were organizational maturity, organization type, services provided, occupational backgrounds of board members, and board diversity. I spoke with nonprofit experts within the community to gain a background understanding of the nonprofit sector, which I then used to design a short survey, which I planned to then send out to local nonprofit organizations. However, due to the unfortunate circumstances of the second half of the spring semester, I was unable to send out my survey. Instead, I created my own database in which I gathered available online data from nonprofit organizations to better understand the board makeup of some organizations within the community. Nonprofit organizations are a great asset to our society, provide important services, and spark change. The nonprofit sector is varied, complex, and ever-changing, and I hope this project to be a step into understanding it.

Title: Habitat Housing
Poster # 31
Presenters: Alexis Garza

In this project we are looking up the tax data for Winnebago County from the years of 2003-2018 for Habitat Housing. We are looking at the taxes placed on the land from the time the land was originally purchased to when the home was placed on it. This data is to show the impact the home has on the taxes to that land. It also shows how much Habitat Housing has made in profits from just owning the land with those original taxes to placing a home on the land, which increased the taxes and profits they were receiving from that piece of land.
Title: **Identification and Implementation of Corporate Values**
Poster # 39
Presenters: *Peyton Adams, Keanu Esquivel, Austin Green, Vern Jensen, Edgar Nunez, Ashley Ryan, Margaret Strote*

Corporate core values are the fundamental ideals upon which an organization and the behaviors of its workforce are based (Chen, 2018). We worked with a large automotive technology company to identify gaps between their newly implemented core values and employees’ current behaviors as well as provide recommendations on how to ensure consistent and sustained adoption of these new values. During this research project, we (a) attended value workshops held by the company, (b) analyzed the value workshop data from their current employees, (c) interviewed senior leaders in the company, (d) interviewed regular employees in the company, and (e) designed a benchmarking survey for other organizations values rollout processes. We will share a sample of these results during the URAD presentation and discuss our recommendations for ensuring consistency and sustainability of these new values.

Title: **Telemedicine: A Study on an Emerging Industry**
Poster # 92
Presenters: *Ainsley Galvez, Madelyn Jackson, Tyler Shaw, Fnu Ankita*

During our time in the Experiential Learning Center, we helped a client in conducting market research on a fairly new industry, telemedicine. During our time, we contacted telemedicine companies, nursing homes, and other people trying to advance in the telemedicine industry. Our research presents these conversations, that we had regarding the industry. It will be presented in two parts: the interviews with the competition, and the analysis of the clients. Most telemedicine companies are either a B2B or a B2C business. For our project, we decided to focus on B2B businesses focusing on nursing homes.

Title: **The Shelby Group - ELC Project Spring 2020**
Poster # 107
Presenters: *Can Sun, Rohan Sunil Mali, Ajaybharadhwaj Mahalingam, Charity Munjeli, Khushal Kishor Mohite*

The Shelby Group is a global leader in e-procurement platform implementation and optimization. In this project, The Shelby Group would like a team of consultants to evaluate the results of consolidation, come up with new KPIs, and brainstorm new process standardization ideas to help increase effectiveness and efficiency in project execution. Given part of customers and sales data, we analyze the company’s profit & loss, time management and metrics. With stepping deeply in the analysis, we expand to areas in Revenue & Cost, Data Recording, Predictive Model & Risk Management, Employee Analysis & Training (Return on Investment) and Metrics. Our team members come from different majors varying from Business Administration, Management Information Systems to Electronic Engineering, so we will contribute expertise knowledge in different subject to this project and analyze from different angles.

Title: Therome Innovation Partners
Poster # 108
Presenters: Edgar Lopez, Samantha Davalos, Nora Smith, Hannah Muntz, Nolan O’Rear, Prathibha Kolli, Sai Chaitanya Srinivas

The Experiential Learning Center (ELC) is a program in the Northern Illinois University (NIU) College of Business that offers students the opportunity to interact with companies as consultants. Students are placed in groups of approximately seven and are assigned a team coach and an assistant coach. During a semester, students interact with the client to find what the business needs and then plan on how to achieve certain agreed-upon deliverables. Therome Innovation Partners is a biomedical start-up that specializes in ocular therapeutics and diagnostics used to treat age-related macular degeneration and diabetic retinopathy. Dr. Elizabeth Gaillard and Dr. Kalyan Karumanchi founded Therome Innovation Partners, LLC. Our team presented the Northern Illinois Research Foundation and Therome Innovation Partners, LLC with recommendations as to how to move forward for business development. Our team developed an organized and detailed business plan focused on marketing and finance. This business plan contains business goals, methods to attain those goals, and a timeline of when to achieve those goals.
Title: Reciprocal Relationships: Future Teachers’ Authentic Experiences in High-Minority, High-Poverty Primary Classrooms *ED
Poster # 78
Presenters: Raven Stepter

The purpose of this study is to examine the experiences of preservice teachers in high-minority, high-poverty classrooms. For this research investigators worked directly with preservice teachers using face-to-face individual pre and post interviews. Preservice teachers in the Early Childhood Program at NIU have participated in a program titled The Open Doors Program for the past four years. This program provides preservice early childhood educators to work hands-on with first and second grade students in a high-minority, high-poverty elementary school. Implementation of pre-service learning programs like Open Doors have shown a positive impact on preservice teachers’ classroom readiness. Leaders from The Illinois State Board of Education (ISBE) report that creating real-world classroom opportunities for preservice teachers help them to develop skills used by effective educators (Illinois state Board of Education, 2018). Illinois student population is increasingly becoming more diverse, while the pool of future teachers remains White and female (ISBE, 2018). In turn the need for preservice teachers to be prepared to teach in Black and Brown schools is important to teacher candidate success. The examination of preservice teachers’ first-hand experiences in underprivileged schools and the data collected, allow for a deeper examination of the positive and/or negative benefits to pre-service teachers engaging in direct experiences in underserved Black and Brown public schools.
Title: Living Mechanization
Poster # 58
Presenters: Manley Ruiz

The concept itself is that every living thing plays a larger/important role in life. To best represent this idea by using a combination of machinery or machine parts and combining with either psychological concepts, living creatures, or various human body parts. By utilizing these objects/organisms as a basis for the concept it could create the idea that even the smallest thing can play an important role if it maintained like a good oil machine. To help support this idea is the utilization of a somewhat graphic novel-like style to create a realistic/morbid feel in these works.
Title: **Is the 5-second rule real or not?**  
Poster # 50  
Presenters: **Karim Abdelgader**

Our major question is, the 5-second rule is it real or not? Our hypothesis is the 5-second rule is real, because the longer the food is on the floor the dirtier it becomes. It makes sense to us that if food is on the ground for a longer period of time it will obtain more bacteria. We tested cheese, bread, and turkey. Our data shows that the 30-second cheese has more bacteria than the 5-second cheese. The 5-second piece of bread had way more bacteria than the 30-second piece of bread. The 30-second piece of turkey had more bacterial colonies than the 5-second piece of turkey.

Title: **Does hot sauce inhibit bacterial growth?**  
Poster # 18  
Presenters: **Kalie Anderson**

First semester in Microbiology class we learned about how antibiotics cause rings of inhibition when tested in Petri dishes on bacteria. I was interested in finding out if hot sauce could also cause a ring of inhibition when tested on bacterial growth. Hot sauce indeed does stop bacteria from growing causing a ring of inhibition. I further wanted to test which specific ingredients in the hot sauce would do the same. I tested the main ingredients found in multiple different types of hot sauces: salt, garlic, white onion, and peppers. My data shows that the ingredient that worked the best was garlic; The onion and the salt did not have a ring of inhibition or it was too small to be significant. The peppers we never got to because of the current situation of COVID-19.

Title: **Do females or males contain fewer bacteria on their hands after doing everyday activities?**  
Poster # 17  
Presenters: **Yamile Aparicio**

Do females or males contain fewer bacteria on their hands after doing everyday activities? We picked two of our peers to help us out, one female and one male. We asked both to touch a slice of bread with unwashed hands and washed hands. This was done for three more times but with different objects, phones, door handles, and Chromebooks. The bread was left out for more than a month to see what would grow. We are still currently waiting for results. The same procedure was done also but with Petri dishes. We incubated them at 37 degrees Celsius and in 24 hours we saw results. The results showed there was no huge difference between male and female bacteria on their hands. After 48 hours the results were different, men had more bacteria than females.
Title: **Nutrients like Phosphorus, Nitrogen, and Potassium are the main causes of algal blooms, but which one is the most effective?**

Poster # 70  
Presenters: **Max Meyer**

Algae has a tendency to grow rapidly out of nowhere which is a strange phenomenon known as algal blooms. The main question is what exactly causes these blooms to occur? An article pointed in the direction of farm fertilizers which are providing a surplus of nutrients through runoff. Nutrients like Phosphorus, Nitrogen, and Potassium are the main causes of these blooms, but which one is the most effective? By using several different algae and applying differently-treated, artificial runoffs together, the effects of the nutrients on algae can be tested. According to the article, most sources came from fertilizers rich with phosphorus, so if the experiment is carried out correctly the outcome would prove exactly which nutrient has the most positive effect on algae. Learning what nutrient is most responsible would help to regulate the algal blooms which are harmful to their aquatic environments and nearby land environments.

Title: **How dirty are smartphones compared to flip phones?**

Poster # 34  
Presenters: **Jared Reed**

Everyone has a cell phone. Knowing how dirty they are I think would help people be more aware of how often they need to clean them. There was a sample taken from a smartphone and a flip phone using a cotton swab. The swabs were used to plate Petri dishes with agar to see if there was any bacterial growth. Petri dishes were incubated and the measurements of the two phones were taken including the case of the smartphone. The results of the project showed that the smartphone had more bacterial growth than the flip phone.

Title: **Which version of milk will have more bacteria?**

Poster # 118  
Presenters: **Kevin Sanchez**

There are so many kinds of milk now available at the supermarket. What are the differences and which one has the least amount of bacteria? We tested three types of milk: ultrafiltered organic, 2% regular pasteurized and two samples from different farms in the area of Holstein unpasteurized. Overall out of the different kinds of milk tested we predict that the ultrafiltered milk will produce the least amount of bacteria when grown on agar in Petri dishes.

Title: **Does the antimicrobial properties of honey effectively inhibit the growth of Lactococcus bacteria?**

Poster # 20  
Presenters: **Cameron Sullivan**

Cheese has been produced in America since the 17th century. Wouldn't it be interesting to see what could happen to cheese if you added Manuka honey? I find the concept of using a natural substance as a possible antiseptic/antibiotic an interesting and beneficial idea worth study. I also wanted to learn more about the natural microbial processes of cheese-making. Testing each in this particular way means that I can combine multiple interests of mine into one experience and share it with others. In my experiment there were two tests, one in vitro, testing whether or not the honey is effective at all against the bacterial culture, the second test will be a larger scale test seeing how it might affect the cheese-making process.

**CES: Community Engagement Showcase, H: Honors Program, HC: Honors Capstone, ED: Equity/Diversity**
Title: *Why do pH and microbes differentiate between different bodies of water?*

Poster # 120

Presenters: *Charlotte Zinke*

Different waterways are inhabited with different kinds of organisms, why? How do pH and microbes affect the organisms that inhabit the waterways? pH may affect the healthiness of the waterway and what type of organisms will survive best in the water habitat. The process of photosynthesis by algae and plants uses hydrogen, thus increasing pH levels. Likewise, respiration and decomposition can lower pH levels. We took samples and tested a couple of bodies of water to see their pH levels and plated Petri dishes to identify if bacteria were present in the water. This experiment is still on going.
SYCAMORE HIGH SCHOOL

Title: The Effect of Water Hardness on the Freshwater Gastropod Population of the East Branch of the South Branch of the Kishwaukee River
Poster # 96
Presenters: Abby Krull, Ashley Parks, Emily Davis

In past studies on aquatic gastropods in the East Branch of the South Branch of the Kishwaukee River (EBSB) subwatershed there were three commonly identified gastropods observed: Physella integr , Lymnea stagnalis, and Planorbiella truncata. Now the focus is on what properties of stream sites prompt the highest population of aquatic gastropods. At each stream site around the Dekalb County area, a Smart Digital Water Testing device was used to measure the various chemical qualities of the water. The factor this study focused on was water hardness. Research done during the summer of 2019 resulted in quantitative observations on stream quality resulting in patterns as to what conditions are more favorable to gastropods. Other research helped to solidify the validity of the observations. With this baseline information, the study will predict the most optimal stream sites in the domain of the EBSB for the use of future experiments. For example, with the predictions concluded from this study, future experiments could look into a numerical correlation to that of aquatic gastropod population numbers and different quality values in regards to the stream.

Title: The Relationship Between Unionidae Mussel Growth Band Spacing and Age
Poster # 105
Presenters: Emalyn Polz

Freshwater mussel populations are declining in the Kishwaukee River Watershed and efforts are underway to identify species and habitats in the largest need of saving and restoring (Douglass and Stodola 2014). This study focuses on populations of Unionidae mussels within the East Branch of the South Branch of the Kishwaukee River Subwatershed (EBSB) in an effort to contribute to improvement of local streams. Surveys performed throughout the EBSB sub-watershed looked at the age and spacing between each growth band of the freshwater mussels. The number of rings were counted on each specimen to find an approximate age. Then, the distance between each dark growth ring was measured to determine how much that mussel grew each year.

Title: The Effects of Dredging on Unionidae Populations in Virgil Ditch 3
Poster # 98
Presenters: Chelsea Smith

Many habitats of mussels in Northern Illinois are on agricultural lands. In order for the landowners to avoid flooding issues, they dredge the waterways. This is the case for Virgil Ditch 3, a site that has had an increasing mussel population over the last five years. Portions of Virgil Ditch 3 were dredged in 2016, 2018, and 2019. Throughout this time period, the mussel populations have fluctuated, but have trended towards increasing in size. Data for this research has been collected by members of the Sycamore High School watershed class over the past 5 years using chemical testing and man-hour mussel surveys. This research is being compiled to not only document this data but also predict the outcome for the future of the habitat. Based on other studies of habitats and organisms impacted by dredging the effects can be detrimental. These facts should be considered as individuals and organizations make their plans to dredge.

CES: Community Engagement Showcase, H: Honors Program, HC: Honors Capstone, ED: Equity/Diversity
Title: *Addressing the decline of Mollusca in the Kishwaukee River Basin*
Poster # 2
Presenters: Vani Subramony, Abby Carter

Freshwater mussel (Mollusca) populations greatly influence the biodiversity of stream sites all over the world, serve as food sources, and increase the quality of the river. In stream sites across the globe, it has been discovered that climate change, large impoundments, and pesticide-runoff contributing to heavy metal poisoning can have negative impacts on mussel populations. In an exploratory field study conducted in 2019, our student team compared mussel populations discovered through systematic quadrat sampling to those in the same radius in 2017. We discovered a steep decline in freshwater mussel populations at the East Branch of the South Branch of the Kishwaukee River at Motel Road (42.001068, -88.708599). Specifically, the population fell from 76 mussels within a 200 yard site to 7 mussels within the same site (a 91% decline). By analyzing past mussel data and noting stream site changes in riparian vegetation and water chemistry, we seek to discover the causes behind this decline as well as develop strategies to address them.
# ALL PRESENTERS LIST

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</table>
Thank you!

Event Staff (Office of Student Engagement and Experiential Learning):

Saudamini Agarwal
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Arlene Elias
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Division of Enrollment Management, Marketing and Communications
Document and Print Management, Division of Information Technology