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Undergraduate Research and Artistry Day
and the Community Engagement Showcase

Wednesday, April 17, 2019
9 a.m. to 2 p.m.
Holmes Student Center
Letter from the Office of Student Engagement & Experiential Learning

Welcome to the 9th annual Undergraduate Research and Artistry Day and Community Engagement Showcase! From research on potential impacts on the Kishwaukee River’s water quality due to surrounding environment and seasonal effects to community engagement projects focused on the effect free, shared meals provided by ‘Hungry Huskies’ has on student’s mental health, 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, Undergraduate Special Opportunities in Artistry and Research, Student Engagement Fund, Summer Research Opportunities Program, the Research, Engagement and Academic Diversity Grant and Community Engagement programs like Huskie Service Scholars and Huskie Alternative Breaks will 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 showcase 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
Greetings,

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

The undergraduate students participating in this event have worked closely with talented members of NIU’s faculty and staff to develop critical thinking skills, to solve complex problems, and to create new knowledge. I am proud of their accomplishments as scholars, scientists, engineers, artists and inventors. I am confident that they will become life-long learners, as well as empowered, informed, responsible citizens.

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

Lisa Freeman and Christopher K. McCord
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Awards

Prizes are awarded in six categories:

**URAD STEM: Science, Technology, Engineering and Mathematics**  
(presented by the Office of Student Engagement and Experiential Learning)

**URAD AEHHSS: Arts, Education, Health, Humanities and Social Sciences**  
(presented by the Office of Student Engagement and Experiential Learning)

**Exhibits**  
(presented by the Office of Student Engagement and Experiential Learning)

**Community Engagement Showcase**  
(presented by the Office of Student Engagement and Experiential Learning)

**Humanities Award**  
(presented by the Humanities group of the College of Liberal Arts and Sciences)

**URAD PCSOGI**  
(presented by the Presidential Commission on Sexual Orientation & Gender Identity)

Schedule of Events

**Viewing of Projects**  
(Presenters will rotate throughout the event)

- **URAD Session 1**  
  9:00am - 10:15am
- **URAD Session 2**  
  10:15am - 11:30am
- **URAD Session 3**  
  11:30am - 12:45pm
- **URAD Session 4**  
  12:45pm - 2:00pm
- **Community Engagement Showcase**  
  12:00pm - 2:00pm
URAD Judges

- Alex Walkington, Alumnus
- Anna Forba, Counseling and Consultative Services
- Ashley Blackwell, Psychology
- Brandon Lagana, Career Services
- Brian Berchtold, Undergraduate Studies
- Cathy Doederlein, Career Services
- Charles Achilles, Alumnus
- Chris Einolf, Nonprofit and NGO Studies
- Christy N. Wails, Biological Sciences
- Dawn Valdés Wagner, Alumnus
- Dhiman Chakraborty, Physics
- Donald Zinger, Electrical Engineering
- Emily Murphy, First & Second Year Experience
- Jac Cooper, First & Second Year Experience
- Jason Hanna, Philosophy
- Jeanne Meyer, Student Conduct
- Jeffrey Salmon, MPTSS
- Joe Lovelace, Student Legal Assistance
- Kathleen Kelly, Psychology
- Katie Granger, Center for P-20 Engagement
- Kristin Huffine, History
- Laurence B. Lurio, Physics
- Leanne VandeCreek, University Libraries
- Masih Shokrani, School of Health Sciences
- Matt Darnell, Alumnus
- Matthew Streb, Admin
- Melinda Verdone, Alumnus
- Nancy Prange, School of Health Services
- Natalie Andzik, SEED
- Nestor L. Osorio, University Libraries
- Nina Mounts, Psychology
- Patty Wallace, Division of Research and Innovation Partnerships
- Peter Chomentowski, KNPE
- Peter Olson, Art Museum
- Pi-Sui Hsu, Educational Technology, Research and Assessment
- Renique Kersh, Associate Vice Provost
- Roland Winkler, Physics
- Scot Schraufnagle, Political Science
- Scott Mooberry, Environmental Health and Safety
- Shanthi Muthuswamy, Technology
- Sheila Barrett, SHS
- Steven Daskal, Philosophy
- Thomas Gilbert, Chemistry & Biochemistry
- Valerie Garver, History
- W. Scott Grayburn, Biological Sciences
- Zachery Nielsen, First & Second Year Experience
- Zhili Xiao, Physics

CES Judges

- Brian Richard, Center for Governmental Studies
- Jaclyn Vasquez, Alumnus
- Marques Clark, Alumnus
- Melissa Burlingame, Environmental Studies
- Nancy Prange, School of Health Sciences
Event Floor Plan

Please note: URAD & CES take place in the Duke Ellington Ballroom and The Capitol Room located in the Holmes Student Center.
Event Map (Gallery Lounge)

HALL TO DUKE ELLINGTON BALLROOM ENTRANCE

GUEST/VOLUNTEER CHECK-INS

UNDERGRADUATE RESEARCH AND ARTISTRY DAY AND COMMUNITY ENGAGEMENT SHOWCASE CHECK-IN

FURNITURE/LOUNGE AREA

JUDGES' CHECK-IN IN REGENCY ROOM

PRESENTER CHECK-IN
<table>
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<th>Judge Entrance</th>
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Abstracts: URAD Posters

Please note: All abstracts are printed as submitted by project participants, and are represented in the college of the student’s project.
1  Micah Volle  
EVS Throughput Improvement  
Presenter(s): Micah Volle, Leena Ghrayeb  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Gary Chen, Purushothaman Damodaran, Christine Nguyen  
Session Time: Session 4

A company’s ability to effectively utilize their resources is a critical element in providing a quality product or service in an efficient manner. In a hospital setting, inpatient rooms are an important resource frequently in high demand. As a result, when a patient is discharged it is important the turnaround time, the time it takes to clean and prepare the room for a new patient, is as small as possible. At Northwestern Medicine Kishwaukee Hospital, the average turnaround time is 181 minutes which is 86 minutes longer than the average turnaround times at other Northwestern Medicine hospitals. This additional time spent turning a room is reducing Kishwaukee’s capacity, which causes admitted patients to wait longer in the emergency department before being moved to an inpatient room. This project has studied the causes of extended turnaround times, researched best practices that can be adopted at Kishwaukee, and assisted management in the implementation of several process changes that have helped reduce turnaround time.

2  Molly Schultz  
Manufacturing Efficiency Improvements on High Variation Lines at Motorola Solutions, Inc.  
Presenter(s): Molly Schultz, Saad Aldakhil, Kodi Platt  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Purushothaman Damodaran, Christine Nguyen  
Session Time: Session 3

Motorola Solutions Inc. is a manufacturer of high quality telecommunications equipment. Their newer facility in Elgin, IL assembles portable and mobile devices. Each of these products has two different types of production lines (Build & Customization lines). This project presents opportunities for efficiency improvements on the customization lines of portable and mobile devices. Management teams and line leads struggle to hire and allocate the right number of workers to maximize efficiency during specific demand periods. Given the high variation in product mix and demand figuring out the optimal crew size is paramount to balancing each production line. By creating a current state model using Arena Simulation important performance metrics were captured such as line efficiency, worker utilization, product wait times, etc. The goal is to perform an in-depth scenario analysis on employee allocation to provide line leads an effective tool for managing their production lines.
3 Di’Quan Ishmon  
Investigating Additive Manufacturing Techniques in Titanium Implants Porous Structures  
Presenter(s): Di’Quan Ishmon  
Department: Mechanical Engineering  
Faculty Mentor(s): Federico Sciammarella, Sahar Vahabzadeh  
Session Time: Session 4

Titanium (Ti) metals are mainly used in advanced applications (i.e. high-performance engines) because they have high strength, low density, and excellent corrosion resistance. One limiting factor on the use of titanium for other applications is its cost. Due to this cost, Titanium Alloys are typically used for high value components such as orthopedic prosthesis. Conventional manufacturing of prosthesis using titanium is also very costly and can result in a lot of scrap material (i.e. machining a bulk piece of Ti). As a result, many companies use additive manufacturing titanium as a potential solution to cost reduction. In particular, the leading industries are in the aerospace, automotive, and medical due to the high value of the components they build. Titanium Implants have a significant impact on the human body. Conventionally manufactured implants, while successful, can often lead to the need to have multiple revision surgeries due to implant separation. In addition to cost reduction, additive manufacturing provides the potential to improve the Titanium Implants by enabling porous structures to be designed to maximize adhesion. In additive it’s possible to control parameters that can help define the mechanical properties of Ti. For this study the Optomec LENS Direct Energy Deposition system will be utilized. The aim is to understand the correlation between the process parameters and the mechanical properties of Ti. It is anticipated that we will find an optimized set of process parameters that will enable bone growth and maintain a proper young’s modulus to ensure the integrity of the implant.

4 Andrew Pak  
Improving Actual Anodize Department Revenue at Custom Aluminum Products  
Presenter(s): Andrew Pak, Alanna Wilcox, Guna Shekar Kolluri  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Purushothaman Damodaran, Christine Nguyen  
Session Time: Session 2

Custom Aluminum Product’s anodize department has produced an annual revenue that is hundreds of thousands of dollars less than projected. This lower than expected amount represents missed opportunities for revenue, which could have been earned in addition to the amount already generated. The project explored various root causes to determine potential solutions to explain this occurrence, to more accurately predict potential revenue, and to increase actual revenue for the future fiscal years which could be applied across all anodize customers.
5  Devonte Rodgers

Standardization and the Improvement of Warehouse Operations
Presenter(s): Devonte Rodgers, David Franz, Nidhin Dileepkumar, Sajith Gopinathan,
Department: Industrial and Systems Engineering
Faculty Mentor(s): Christine Nguyen, Purushothaman Damodaran
Session Time: Session 4

Suncast creates wood, plastic and resin products. Suncast integrates a new warehouse management system in their distribution center. Suncast has no data on how the system affected its processes. Industrial and Systems Engineering major’s apply their knowledge to standardize the warehouse and provide suggestions for improvement.

6  Aspen Wheeler
Assessing Faculty Participation in Undergraduate Research Programs
Presenter(s): Aspen Wheeler
Department: Industrial and Systems Engineering
Faculty Mentor(s): Michaela Holtz
Session Time: Session 2

Our higher education system is in the process of a dramatic overhaul. High Impact Practices (HIPs) are being utilized to demonstrate learning in and outside of the classroom. The goal of HIPs is to provide enriching educational experiences that can be life changing, but they also take a considerable amount of time and effort from both faculty and students (NSSE, 2015). Just as HIPs positively effect undergraduates experience, in a supportive environment, they can also enhance faculty experience (Malachowski, 2012). In order to ensure success, both student and faculty need a network of support. Incentives for faculty could include reducing teaching loads for those engaged in HIPs, awards, or considerations for career advancements (Downs & Youngs, 2012). My goal is to 1. identify what are the barriers for faculty mentors’ engagement and 2. gauge the interest of undergraduates and faculty in having graduate students involved in the mentorship process. I plan to use these results to guide implementation of existing and new engaged learning opportunities that require individualized faculty mentoring. This process will also help to increase capacity in programs that successfully engage and support disadvantaged students, while also building a stronger foundation for our graduate and faculty mentors.
The SPX Flow Makino Cell Capacity Analysis project focuses on a detailed analysis of two machining cells present in the SPX Flow Hydraulic Technologies facility located in Rockford, IL. The company currently has a capacity and facility layout problem. The purpose of the project is to propose an appropriate facility layout along with any other recommendations regarding scheduling or ergonomics that will improve productivity, reduce travel distances, and vacate valuable floor space. The complete analysis has many components ranging from time-studies to data analysis. Time-studies and observations are conducted to analyze the ergonomic aspects of the problem, while data analysis will provide ways to work towards a layout solution. At the completion of the project, SPX Flow should have the necessary conclusions to begin implementation within the next five years.

A thorough understanding of particle flow can be vital in many global processing systems. In this experiment, the flow of uniform particles within a bottom driven conveyor belt system was observed to measure the flow decay with respect to height within the system. Both horizontal and vertical velocity profiles for the flow were created based on the observed flow decay. Analyzing the velocity decay in these plots showed a region near the base of system where velocity decay was linear, but after reaching a certain height within the system, the decay became exponential. The linear decay found varied depending on the speed of the conveyor belt which sheared particles through the system, as well as on the size of the outlet through which particles exited the system. By comparing the linear decay for each combination of variables at several critical locations throughout the system, the vertical and horizontal shear rates could be determined. Just as the shear rates of system were analyzed in a 2D plane, so too must the shear rate in the system’s third dimension be considered. This additional shear rate could allow for better estimation of the internal mass flow rate of the system. By comparing the calculated internal mass flow rate to one found empirically, losses within the system can be determined. Future experiments pertaining to this research may include the further development of the imaging process so that the flow of non-uniform particles can be more closely studied.
9  James Iglesias  
*Streamlining Packaging & Shipping Processes and Optimizing Inventory Storage*

Presenter(s): James Iglesias, Sameh Murad, Rajesh Akash Barathvaj  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Purushothaman Damodaran, Christine Nguyen  
Session Time: Session 3

Aurora Specialty Textiles Group (ASTG) in Yorkville is a finisher type textiles factory which processes fabric rolls of various sizes/materials and ships processed rolls to customers. Processed fabric rolls are transported by forklift to several departments for different processing applications to be applied before being transported to the shipping department. ASTG has recently relocated their facility. The current placement of machines and storage of finished product is inefficient and disrupts the flow of packaging processes and the storage of processed rolls. During the last two years, inefficient space utilization has resulted in accumulation of large quantities of finished goods. This has caused difficulty in day-to-day operations of the inspection, packaging and shipping departments by taking valuable floor space required for other operations such as packaging, palletizing and staging of finished rolls. Aurora Specialty Textiles Group partnered with the school of Industrial and Systems Engineering to address the issues regarding packaging and storage. A streamline flow was created between the inspection and shipping departments. A work station space for packaging procedures involving palletization was created. This resulted in the elimination of clutter and decrease in the distance traveled. Distances traveled by the forklift operator during the packaging process were reduced by at least 30%. The inventory was reorganized, storage and packaging areas for finished products were designated. Utilization of the racks for finished canvas storage was increased by at least 15%. Spaghetti diagrams, CAD modeling, heat maps and excel were the tools used in order to achieve objective.

10  Porfirio Navar  
*Additive manufacturing using Direct Energy Decomposition*

Presenter(s): Porfirio Navar, Mark Sliwka  
Department: Mechanical Engineering  
Faculty Mentor(s): Federrico Sciammarella  
Session Time: Session 4

Additive Manufacturing (AM) is a ever going industry with large success in the application of highly specific structure dependent parts, the wide range of material that can be used makes AM more attractive to several industry. Currently there is a need for a formula/relationship that can be used for optimizing micro-structures with any Direct Energy Deposition system (DED). A method for characterizing DED fabricated materials based on specific input parameters has been developed at Northern Illinois University. Experiments using an Optomec LENS 850M, with 316L stainless steel powder. Input parameters i.e. beam size, travel speed, powder flow, power input and calorimetry data have resulted in a non-dimensional energy relationship to predict the resulting microstructure and providing repeatable hardness, and reduced porosity. Based on this non-dimensional energy function, desirable microstructural properties for 316L can be better predicted reprocessing and optimized for numerous types of DED systems.
Studies suggest that choral singing has psychological and communicative benefits for individuals with aphasia, an acquired, neurogenic disorder inhibiting one’s access to language. However, few studies on the topic exist. Moreover, existing studies focus on qualitative effects of choir participation. The purpose of this study is to provide quantitative evidence that choir participation can help individuals with aphasia make significant gains in functional communication.

The participant in this study, KR, presented with primary progressive aphasia, a form of dementia resulting in language deterioration. Our participant is a member of the Bridges Choir, a DeKalb choir designed for individuals with cognitive-communicative problems. Baseline data were collected for KR’s cognitive status, language, and functional communication two weeks prior to the first choir rehearsal. Language samples were collected immediately before and after each of the once-weekly rehearsals over an eight-week period and analyzed for changes in word-finding and verbal fluency. Finally, an interview was conducted to measure qualitative changes in KR’s language, cognition, and/or affect.

Although KR stated that she felt it was easier to find words after rehearsals, quantitative analysis of her language samples revealed no significant changes in word-finding nor verbal fluency immediately after choir participation, although verbal fluency did show a (statistically insignificant) trend towards improvement. During KR’s interview, she expressed positive, qualitative results related to choir participation, consistent with the literature. Future research recommendations include examining language from more choir participants, eliciting longer speech samples, and adding within-subject control conditions to account for possible activity-related fatigue.
Inflammatory Bowel Disease (IBD) represents a spectrum of progressive immune-mediated inflammatory conditions predominantly affecting the digestive tract. Crohn’s disease and ulcerative colitis comprise the primary diagnoses classified as IBD. These conditions are often disabling with significant impacts on quality of life. Despite the development of more effective therapies for IBD in the last two decades, many patients still experience severe disease progression due to delays in diagnosis and non-objective management strategies. Evidence-based guidelines have emphasized the need for laboratory-derived markers of inflammation for use as surrogate measurements to the gold standard of endoscopic assessment. While serum biomarkers, such as C-reactive protein (CRP), have been used more extensively, fecal calprotectin (FCP) testing has shown increased recognition and use in recent years. The purpose of this project was to evaluate the use of FCP measurement in the diagnosis and management of IBD. Relevant studies were compiled for analysis using the PubMed database; other resources included IBD-specialist physician researchers for consultation and recent gastroenterological society presentations. The outcome of this project shows that compared to serum markers, FCP testing assesses disease activity in IBD with increased sensitivity (89% vs. CRP’s 68%) and specificity (72% vs. CRP’s 58%). In addition, FCP demonstrates the strongest correlation to endoscopy (e.g. r = 0.75 vs. CRP’s r = 0.53 with Simple Endoscopic Score). As a screening tool, FCP can exclude functional digestive conditions with approximately 100% accuracy, thereby reducing unnecessary testing and diagnostic delays. The tailoring of IBD treatment plans based on the results of FCP measurement has demonstrated significant improvements in patient outcomes (e.g. 20.5% increase in steroid-free remission at 48 weeks). Increased implementation of FCP testing will reduce unnecessary testing, minimize diagnostic delays, and facilitate more optimal use of therapies, leading to increased rates of sustained remission and less disease progression in IBD patients.
13 Alexa Scaliatine  
Semantic Representations of Real and Novel Words in Children with Autism  
Presenter(s): Alexa Scaliatine  
Department: Allied Health and Communicative Disorders  
Faculty Mentor(s): Allison Gladfelter  
Session Time: Session 2

Children with Autism Spectrum Disorder (ASD) show delays in their first spoken words, and nearly 1 in 5 children with ASD remain functionally nonverbal throughout their lifetime. Even when children with ASD do learn to say words, they process semantic information (word meanings) differently than their neurotypical peers. Little is known about how these processing differences influence how children with ASD produce semantic representations and define words. The aim of this study was to explore the types of semantic features children with ASD produce when defining real or novel words, and to determine if they differ from their neurotypical peers. Twenty-five school-aged children with and without ASD matched on age and nonverbal IQ participated in a word-learning paradigm. Participants were taught real and novel words and then were asked to define them. The definitions were coded for the number and type of semantic features produced. The types of semantic features were classified as global descriptors, local details, perceptual, functional, materialistic, semantic, thematic, narrative, and other. The results indicated that all children produced more semantic features for real words than for novel words. Also, the children with ASD were found to produce fewer local details and perceptual semantic features compared to their neurotypical peers. Because prior research has shown that children with ASD fixate on local details during processing tasks, this use of fewer local features during a production task was unexpected. The clinical implications for understanding how children with ASD retrieve semantic representations from their mental lexicons will be discussed.

14 Nicole Cirrencione  
Level of Nutrition Knowledge Regarding Gluten and Gluten Containing Foods in Differing Cohorts  
Presenter(s): Nicole Cirrencione  
Department: Family, Consumer and Nutrition Sciences  
Faculty Mentor(s): Judith Lukaszuk  
Session Time: Session 3

Gluten is a protein found in wheat, oats, rye, malt and barley. Recently, many people, for health or other reasons, have opted to go on a gluten-free diet. A question that has been trending around the nutrition field is whether most individuals in the general public would be able to identify gluten in a food product by looking at the ingredients, or correctly determine the related background information. The general assumption is that students studying food and nutrition would have a higher level of knowledge regarding gluten and gluten-containing foods. This study examined the nutrition knowledge of current Northern Illinois University (NIU) nutrition students, compared to students from various other major departments at NIU. Each cohort was evaluated on their ability to accurately answer questions pertaining to gluten and gluten-containing foods. Part I of the questionnaire contained factual questions and part II contained demographic questions for use in statistical analysis. To create a tool for professionals to understand this educational variance, the groups participated in a quick survey that evaluated their current gluten knowledge level. The collected information may be used to gain more insight on the areas that people should focus their attention towards when trying to understand gluten and any related properties. The data may also be useful to identify the progress of nutrition education pertaining to gluten, as well as to identify the discrepancies needing to be addressed. A teaching model and individualized learning approach could be formulated from this research.
The FoodMASTER (FM) Initiative uses food as a tool to teach mathematics and science. To enhance the fidelity of FM activities, the FM team is developing a set of food and nutrition (FAN) cards that align with the existing curricular materials. The FAN cards provide informal science learning environments such as museums, after school programs, and youth organizations with quick and easy to implement science lessons and formal education environments with mini science lessons to introduce the more extensive FM activities. In some instances, FAN card activities can also be modified for use as a hands-on learning assessment tool or modified for quick science festival or health fair activities. The purpose of this presentation is to provide examples FoodMASTER activities and explain the creative process for developing FAN cards. Educators will be able to use the example activity in most any learning environment and discuss the utility of mini science lessons in exciting learner curiosity.

This study will examine the relationship between pediatric reading disorders and the vestibular-visual interaction in participants. The study will consist of approximately 50 male and female subjects between the ages of 5-14 years old. In conducting the study, the researchers will search for anomalies in the vestibular-visual system that can be causing a reading disorders and related difficulties in children. By performing the study, protocol for improving and specified intervention regarding the reading deficit can be properly manipulated to fit the newly discovered manifestation of the disorder. Patients will have the knowledge of focusing on vestibular care, instead of using traditional techniques that may not necessarily be improving the participants ability to improve or treat the reading disorder.
Language samples provide a rich corpus for multiple analyses that can be used for treatment planning and progress monitoring. The results of language samples can be used for descriptive purposes and calculated measures can be compared to normative databases. This study assessed the use of language sampling in 33 attendees of a session at the 2018 Illinois Speech-Language-Hearing Association convention. Participants provided demographic information related to professional certifications, employment setting, and age of their client base.

Twenty-five reported working with children less than three years of age. Twenty-seven participants reported using language sampling in both diagnostics and the therapeutic process. However, there was variability in the collection and analysis of data. Some participants utilized recording equipment while others wrote down words during the session. Less than half of the participants phonetically transcribed the resulting sample and only 12 reported comparing the results of their language samples to a comparison data set.

Previous research has indicated the need for standardized language sampling techniques in order to allow for accurate comparison to data sets. There is concern that using different toys and contexts do not allow for children to have an equal opportunity to produce a variety of target words and structures making comparison to normative data inappropriate. More research is needed to determine if the language samples collected using non-standardized techniques still provide speech-language pathologists useful information.

In conclusion, this study provides insight on the prevalence of language sampling in speech-language pathology, as well as identify the common therapeutic practices and determine the missing elements necessary to carry out these methods.
The of family of origin is generally where children first learn about the components of relationships, such as, love, honesty, respect, communication (Crittenden, 1997), attachment (Dinero, Conger, Shaver, Widaman, & Larsen-Rife, 2011), commitment, and conflict (Weigel, 2007). For example, Weigel, Bennett, and Ballard-Reisch (2003) interviewed children of divorced or unhappy parents and found these emerging adults were more likely to report learning that relationships are not permanent and should be approached with caution and were less likely to receive messages about the love and partnership required for an enduring marriage. Whereas children with happily married parents often report learning that dedication to one’s partner and hard work are significant factors to the success of a relationship (Gardner, Busby, Burr, & Lyson, 2011; Weigel et al., 2003). The message that many adults stay in relationships due to constraints that make ending the relationship hard, not because they are happy, is also commonly received by children with divorced or unhappy parents (Weigel et al., 2003).

The purpose of this qualitative study was to explore how emerging adults (18-29 year olds) define commitment in romantic relationships and have created meaning from the positive and negative examples of commitment they have witnessed. Twenty (10 men, 10 women) unmarried emerging adults were interviewed individually. Through the use of grounded theory four themes emerged to explain how emerging adults have constructed their understanding of commitment: complete loyalty, investment in the relationship, continual communication, and parental influence. From observing negative and positive examples of commitment, emerging adults learned to discern healthy and unhealthy characteristics of romantic relationships, are working to be different, and have learned what to do to make a committed relationship work long term including the sub-themes of unitedly persevere, prioritize the relationship, consider your partner, give substantial effort, have fidelity. These results extend our knowledge about the model of resilient commitment, and the critical purpose of meaning making. Implications for intervening with emerging adults to strengthen future romantic relationship stability are discussed.

Language sampling provides practitioners a rich base for analysis. Not only does a conversational speech sample provide a natural representation of an individual's communication, intelligible speech is often the ultimate goal of therapy. Early intervention diagnostics often include language sampling. However, there are not readily available normative data sources for comparison, especially in children under two years of age. The intent of this project is to determine the normative values of three semantic measures: number of different words (NDW), number of different verbs (NDV), and number of total words (NTW).

Demographic information and each child's score on the MacArthur-Bates Communicative Development Inventory (MCDI) will be reported. It is hypothesized that the current research will support previous studies that indicate the MCDI is a valid and reliable measure of productive vocabulary. The current project will emphasize the benefits of including language sampling throughout the diagnostic and therapeutic process and provide normative data for speech-language pathologist use.
The human gut is colonized by bacteria very shortly after birth. In healthy individuals, a flourishing microbiome can be observed. However, when this microbiome is depleted, infections and physiological dysfunction can soon take place. The bacteria present in the gut not only help metabolize dietary fibers and synthesize vitamins but also assist in the regulation of the immune system. Hypersensitivity reactions can occur when the human immune response comes in contact with the offending allergens. Considering the adverse effects associated with dysbiosis, the involvement of human microbiome in the development of type 1 or immediate type hypersensitivity, also called allergic response, was investigated in this project.

An exhaustive literature review analyzed findings from a multitude of published articles, textbooks and case reports. The results yielded support for the gut microbiome having a significant effect on the immune system. Specifically, low or altered microbial diversity is associated with increased serum IgE levels that mediate allergic responses. Furthermore, there seems to be a more significant effect of the gut microbiome on the developing immune system in childhood than on the immune system in an adult.

In summary, this study offers a vast compilation of supporting evidence of the relationship between gut microbial diversity and allergic disorders. The role that the environment plays on the developing immune system is still being investigated. In a number of the sources cited in this study, microbial diversity is directly related to environmental conditions. Future research will elucidate how the regulation of the gut microbiome will lead to the prevention or management of allergic responses.
22 Agata Furmanski  
*Motor Learning Treatment Therapy for an English-Second Language Speaker*  
Presenter(s): Agata Furmanski  
Department: Allied Health and Communicative Disorders  
Faculty Mentor(s): In-Sop Kim  
Session Time: Session 1

Motor learning theory refers to the motor system organization and the way in which it may shape itself to learn or relearn a motor task. Prior research studies have evidenced this method to be beneficial for many patients who were learning or relearning limb motor movement. Motor learning research has examined the implications of pre-practice, practice structures, and feedback schedules. With certain applications of motor learning principles, research studies found consistent optimal approaches to learning a limb motor movement. In more recent years, these applications became integrated into the speech realm and found similar consistencies to the nonspeech realm. The purpose of the current research was to explore whether a motor learning theory-based protocol that emphasized specific practice structures and feedback schedules would be more effective in improving English pronunciation of a nonnative English speaker. The motor learning theory-based protocol consisted of six sessions over a five-week period and trained eight sets of stimuli that included 10 items for each set. Results reflected a general trend of improvement in the participant’s English pronunciation abilities, suggesting the possibility that the use of motor learning principles may be a possible intervention method for managing an accent in nonnative speakers.

23 Daniel Olan  
*Consumer Perspectives of Employees with Disabilities in the Hospitality Industry*  
Presenter(s): Daniel Olan  
Department:  
Faculty Mentor(s): Eunha Myung  
Session Time: Session 4

This study examines the perceptions and attitudes of customers toward employees with disabilities in the hospitality industry. Based on the literature review, a survey questionnaire will be developed. Self-administered will be collected from a convenience sample of undergraduate students at Northern Illinois University. The findings will be reported.
25 Katherine Hahn-Boisvert  
*Study of the role of the protein Crag in epithelial cell polarity*  
Presenter(s): Katherine Hahn-Boisvert  
Department: Biological Sciences  
Faculty Mentor(s): Olivier Devergne  
Session Time: Session 2  

I am studying Epithelial cells and their architecture which is known as apical-basal polarity. This polarity is critical to the functions of these cells, and I have been focusing on the basal secretion of basement membrane proteins, a critical component of the apical-basal polarity. Within this, I have been studying a specific protein called Crag, which has been shown to be overly important to the makeup of this polarity.

26 Graice Veronda  
*Degradation of plastic from bags using microbes*  
Presenter(s): Graice Veronda  
Department: Biological Sciences  
Faculty Mentor(s): Scott Grayburn  
Session Time: Session 3  

The purpose of this research is to study microorganisms that may be able to degrade the plastic found in most bags and films. In this project, we are focusing on the bacterium Exiguobacterium Roc37 and the fungus Lecanicillium. Close relatives of these organisms produce enzymes that can degrade biopolymers. In past studies it was found that Lecanicillium can attach to bags made of low density polyethylene (LDPE). Different growth conditions are being evaluated to promote maximum attachment of these microbes to plastic. Changes in the chemical structure of plastic can be determined using Fourier-transform infrared (FT-IR) spectroscopy. Using the plastics from these experiments we can obtain FT-IR scans that give us more information on the effects that the organisms have on the plastics. Information represented by absorbance peaks and plateaus in the spectra can indicate which treatments are changing the structure of the plastics and which are not. These experiments can contribute to a method that will aid in reducing the major plastic pollution problem in an environmentally safe way.
Glioblastoma multiforme (GBM) is the most frequent and combative form of malignant brain tumors in adult humans. Despite the numerous treatments available such as radiation, cytotoxic therapies, and surgical resection, GBM patients have an average of 12-15 months to survive (Cloughesy 2013). Complete surgical resection of the tumor is not possible with GBM. Thus, radiation therapy is a crucial part of treatment for patients diagnosed with the disease. Radiation causes the formation of double stranded breaks throughout the genome of a cell. If left unrepaired, one double stranded break in the DNA is a lethal lesion for a cell. My proposal seeks to explore the role of an essential DNA repair enzyme, DNA-dependent protein kinase (DNA-PK). The proposed study will focus on a technique known as clonogenic survival assay. The clonogenic survival assay is used to approximate the surviving fraction of a cell population following varying doses of irradiation. The purpose of this project is to compare radiosensitivity of DNA-PK knockout (KO) cells to wild-type (WT) cells with normal DNA-PK expression and function. Expected outcomes of this research would show that DNA-PK KO cells are hypersensitive to radiation therapy and will yield a lower surviving fraction compared to DNA-PK WT.

During missions to space, beyond the international space station and passed the Van Allen belt, astronauts are exposed to harmful space radiation which may disrupt fine motor control. Maintaining cognitive and sensorimotor function is important for mission success, and survival may be compromised if these functions are disrupted. The current study varied task demands in string-pulling behavior to characterize fine motor control in rats following exposure to space radiation. Rats quickly engage in string-pulling behavior with highly organized movements.

String-pulling behavior can be broken down into reach and withdraw phases of movement and quantified using topographic (i.e., path circuity) and kinematic (i.e., moment-to-moment speed) characteristics. Data analysis is currently ongoing. These results may establish a foundation for future studies examining the effectiveness of countermeasures to attenuate the effects of space radiation on fine motor control.
Plastic is a mixture of synthetic polymers derived from petroleum and may last for hundreds to thousands of years, leading to ‘near-permanent contamination of the natural environment’ (Sci. Adv. 2017, 3:e1700782). It was calculated that 275 million metric tons of plastic waste was generated in 2010 (Science 2015, 347:768). Much of the small plastic in oceans is eaten by fish, which are eaten by larger animals, including humans (PNAS 2014, 111: 10239). It is unlikely that plastic recycling will completely solve the waste problem therefore other approaches to degrade plastic are needed.

Polyethylene and polypropylene represent about 92% of total plastic production (Curr. Biology 2017, 27: R283). A common form of polyethylene, known as low density polyethylene (LDPE) can release methane, a potent greenhouse gas, in the presence of sunlight (PLoS ONE 2018, 13(8): e0200574). Methane from LDPE is expected to become an even greater problem as more plastic accumulates in the environment.

The first step in plastic degradation is the attachment of microbes to the plastic surface, which is hydrophobic. We have modified a spectrophotometric assay to quantify microbial attachment to LDPE disks. Fourier-transform Infrared spectroscopy showed that plastic used in these studies was more complex than pure LDPE. Many microbes were screened for attachment in this study, including 59 strains of Bacillus megaterium, Exiguobacterium Roc37, Streptomyces coelicolor, and environmental isolates.

Currently coral bleaching is a major issue in biology. Corals bleach when they are stressed, which could lead to them dying. The most common stressor of corals is warm temperatures. Corals are important to biodiversity and are responsible for housing many marine animals around the world. Soon, climate change is expected to increase the amount of coral bleaching. Developing a mechanism that allows coral to recover from bleaching is important. Coral bleaching is thought to involve the death or leaving of photosynthetic symbionts known as algae. The process of symbiont migration allows corals to recover from bleaching. Although migration has been studied for several years, it is still not clear what triggers migration. My plan is to study coral migration and their relationship to reactive oxygen using video and fluorescent microscopy of stressed and controlled coral colonies. I hope to gather more information on what triggers migration and how corals recover from bleaching. Elucidating a mechanism that allows corals to recover from bleaching may provide greater insight to the fate of corals in a warming world.
31 Emily Jones
Variable Distribution of Algae Viruses from the NIU Campus
Presenter(s): Emily Jones, Ausem Kattom
Department: Biological Sciences
Faculty Mentor(s): Scott Grayburn
Session Time: Session 4

Viruses that infect algae may be useful for control of unwanted algal blooms. Viruses produce hydrolytic enzymes to degrade algae cell walls before injecting DNA into the algae. These enzymes can be used to increase efficiency in the extraction of oil from algae for production of biodiesel. Viruses often include genes that are not found in other organisms. In the current study, water samples were collected from four locations at the shore of the NIU lagoon and from one laboratory location. Water was processed to enrich for viruses of freshwater algae then DNA was isolated. A collection of short, synthetic DNA primers based on DNA sequences of known algae viruses was used for experiments using the polymerase chain reaction (PCR). Reactions with different sets of primers were performed using DNA from different locations and scored for the presence or absence of the expected product as well as the presence of size polymorphisms. PCR products were visualized using gel electrophoresis. These studies showed differences in the distribution of freshwater algae viruses from different locations. It was shown that locations V1 and V2 had more markers in common than the distant locations V3 and V4. Our results also showed that primers for genes encoding DNA polymerase and a chitinase gave positive results in all locations. This indicated that those genes are conserved and may be needed for virus survival.

32 Gabriela Ibarra
How is central vision lost in age-related macular degeneration?
Presenter(s): Gabriela Ibarra
Department: Biological Sciences
Faculty Mentor(s): Elizabeth Gaillard
Session Time: Session 1

To study the effects of modifications to the extracellular matrix (ECM) on cell viability in retinal pigment epithelial (RPE) cells. Age-related macular degeneration (AMD) is one of the most prevalent causes of vision loss across industrialized nations, and currently there is no effective treatment to stop the progression of the disease. AMD can be further subdivided into wet AMD or dry AMD with about ninety percent of patients receiving the latter diagnosis. In the course of this disease, RPE cells die, leading to loss of central vision. As individuals age, proteins in the RPE extracellular matrix undergo glycation and nitration which diminishes the ability of RPE cells to attach to the basement membrane. This phenomenon contributes to the loss of photoreceptors in the central, macular region which leads to loss of central vision. Glycation and nitration are important ECM chemical modifications that are commonly seen in postmortem individuals and patients suffering from chronic retinal inflammation, respectively. Knowledge of the effect of chemically modified ECM on retinal pigment epithelial cells may allow for the development of targeted treatments.
The field of engineering functional materials based on nucleic acids (NA) has advanced remarkably since the 1980s when the idea was initially introduced. Merging NAs’ intrinsic properties (i.e. chemical stability, biocompatibility, programmability of structural and functional modalities) with acquired knowledge (i.e. methodologies for interfacing with other materials, extensive range of modification chemistry, etc.) enabled realization of capabilities that are out of reach for conventional synthetic molecules and supramolecular structures. In this work we take advantage of characteristic for DNA i-motifs kinetic hysteresis to design molecular calorimeters. The structures undergo reversible folding/unfolding conformation upon exposure to heat; however, rates of folding and unfolding are the remarkably different. Therefore, we design sensing systems that unfold very fast upon exposure to heat; however, due to the slow folding rate, the sensor do not return to the initial state upon heat dissipation. Molecular calorimetry will provide an opportunity to monitor chemical and biochemical reactions in small volumes including cells and sub-cellular organelles.

Assessing the frequency and seasonality of bird-window collisions at NIU

Annually, millions of birds in the US die as a direct result of anthropogenic activities, including pollution (e.g., oil spills), introduced predators (e.g., cats), and collisions with anthropogenic structures. Previous work has demonstrated that, after introduced predators, collisions with buildings (i.e., window-strikes) are the second leading cause in avian mortality. However, monitoring programs are necessary for detecting avian collisions and without detailed information on the locations, timing, and species affected by collisions, opportunities for mitigation strategies will be missed. The objective of our study was to monitor deaths caused by window-strikes at Northern Illinois University in DeKalb, Illinois to assess how campus structures potentially affect resident and migrating bird species. Here, we conducted surveys of ten buildings on NIU’s campus to look for birds that had struck windows during the Fall 2018 and Spring 2019 semesters. Using ArcGIS, we mapped campus window-strikes to examine for mortality hotspots and identify possible factors contributing to increased bird mortality. Additionally, we evaluated window-strikes in relation to the timing of migration and physical factors of buildings on campus. Unsurprisingly, we found that window-strikes peaked during the height of migration but no mortality hotspots were detected on campus. Most deceased window-strikes were migratory species, possibly indicating that resident birds may be able to avoid striking structures within familiar areas. We advise that window-strike monitoring at NIU continues to better evaluate the effects that the university’s structures have on local bird populations.
35  Rebecca Stelzer

*Structural Approach to Understanding Restoration Management Effects on Prairie Community Composition*

Presenter(s): Rebecca Stelzer  
Department: Biological Sciences  
Faculty Mentor(s): Holly Jones, Nicholas Barber  
Session Time: Session 4

In a prairie community, species diversity and richness can be influenced by bison and fire. Burning the prairie in the spring may increase the abundance and diversity of grass species but decrease the diversity and richness of forbs. Having bison graze on the site after it is burned can increase the species diversity and richness of the flowering plants because bison graze mostly on the grass. This study looks at understanding restoration management effects on the prairie community composition by using data from Robel pole measurements and PAR Light level percentages. Bison play a more significant role than fire, but both bison and fire influence the composition of the prairie. When bison and fire were used on a site the vegetation density of that site was lower than if bison and fire were not used. It is important to have plant density and diversity in the prairie community to support the small mammal and insect communities.

36  Holly Norell

*Development of labs for Physical Chemistry*

Presenter(s): Holly Norell, Eddy Rubio  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Lee Sunderlin  
Session Time: Session 3

For the Development of physical chemistry labs, creating labs that help improve in laboratory setting for experiment set up and data for lab reports. Physical Chemistry is about the study of matter that behaves on a molecular and atomic level. The two experiments that are being worked on is the viscosity lab, and Absorbance Spectrum of a Conjugated Dye lab. The viscosity lab is the study of liquid resistance to flow. The Absorbance Spectrum of a Conjugated Dye is the study of visible spectra of several dye molecules. This experiments will be replacing labs that were preformed in our physical chemistry labs.
Epithelial growth factor receptor (EGFR) is a tyrosine kinase whose overexpression is associated with a number of cancers. Therefore, a sensing system which offers specific fluorescent signaling to detect and monitor EGFR and its distribution at intracellular level is crucial for understanding and control of EGFR associated signaling pathways. Phthalocyanines (Pcs) provide strong absorbance and emission in the near-infrared region which is free from interference of cellular components themselves. Herein, we designed a zinc phthalocyanine-based fluorescent probe for specific binding to EGFR in a “turn on” fashion. The probe remains dark when no EGFR present; however, upon highly specific binding to EGFR it significantly increases emission. The development of the sensing system will ensure better understanding of EGFR role in cellular transformation.

Mosquito vectored diseases are a huge public health concern that is not receiving the rightful amount of attention it deserves. Every year, people in areas with high population densities such as NIU contract mosquito vectored diseases such as west nile virus and malaria. West nile virus also happens to be one of the most common mosquito vectored disease in the United States. The cause for these diseases are due to lack of control over the population of these mosquitoes. This occurs due to the ineffective pesticides that are used on the mosquitoes. These insects have evolved over time and have acquired the ability to produce increased amounts of enzyme esterase which allows the mosquito to survive despite exposure to these dangerous insecticides. The purpose of our Project is to provide more effective pesticides that will be able to efficiently control these mosquitoes without being suppressed by their esterase enzymes. This research will hopefully help establish more public safety initiatives in this area and reduce the health risks for the general population.
39  **Erick Pacheco Grande**
*Of mice and bugs: studying the ecological consequences of invasive house mice (Mus musculus) on Midway Atoll National Wildlife Refuge on arthropod diversity*

Presenter(s): Erick Pacheco Grande, Sarah Naughton  
Department: Biological Sciences  
Faculty Mentor(s): Holly Jones  
Session Time: Session 4

House mice, Mus musculus, are highly adaptive generalists and opportunistic omnivores. On islands “where mice are non-native” they can often apply a strong selective pressure on vertebrates and invertebrates like when they are the sole invasive mammalian predator. Isolated islands often provide key breeding habitats for seabirds; for example, Midway Atoll National Wildlife Refuge is an important breeding ground for over 3 million birds. However, since 2015, house mice started to attack and depredate adult albatrosses. Since then, more recorded predation incidents have been documented, leading to what could be a learned behavior. The eradication of mice on Midway will be conducted in the summer of 2020, which represents an important case study to compare the before and after effects regarding what influence house mice have on island ecology and ecosystem functioning. The two islands on Midway, Eastern and Sand Islands, will be used to compare the abundance and diversity of arthropods pre-/post-mouse eradication. Eastern Island does not have a resident mouse population while Sand Island does, thus providing a unique opportunity to compare mouse impacts in a small, controlled environment. In addition, we hypothesize that slow and large-bodied insects such as members of Coleoptera (Beetles) and Blattodea (Cockroaches) would be preyed upon more frequently on Sand Island. We seek to understand the direct and indirect impacts that house mice have on island fauna, especially the arthropod community. The unexpected results that stem from mouse eradication should be examined before applying this conservation intervention to other islands.

40  **Jessica Gall**
*Comparison of Healthy Shoulder Joints/Rotator Cuff Muscles to Pathological Shoulder Joints/Rotator Cuff Muscles*

Presenter(s): Jessica Gall  
Department: Biological Sciences  
Faculty Mentor(s): Daniel Olson  
Session Time: Session 1

The purpose of this dissection of the human shoulder is to gain an in-depth knowledge of the structures located inside, to identify if there is any pattern in which parts of the shoulder joint begins to degenerate first, and if certain pathologies in the shoulder can lead to the development of new ones. The expected results of this project are to successfully complete a full dissection of the shoulder region so that each structure remains intact and identifiable and without causing destruction to pathologies that already exist. A variety of unique dissection techniques will be used in order to produce the most precise views of the shoulder region.
41 Alyssa Mohr
*Making Zn-Zn Bonds in the Solid State*
Presenter(s): Alyssa Mohr
Department: Chemistry and Biochemistry
Faculty Mentor(s): Chong Zheng
Session Time: Session 2

Zn-Zn bonds beyond those in solid Zn metal are very rare. Only in the last few years have chemists synthesized molecular compounds in which the Zn-Zn bond is present. Here we report the first solid state compound containing fused 12-membered Zn rings. These rings are sandwiched by Sb-S insulator layers. This CsZn4Sb6S12 compound is synthesized by standard solvothermal method. The sample was investigated by powder and single crystal X-ray diffraction measurements as well as scanning electron microscopy (SEM) and energy dispersive X-ray analysis (EDX). SEM image of the sample shows a needle-like crystalline shape and the EDX results confirmed the present of Cs, Zn, Sb, and S atoms. The structure consists of Zn12 rings, Sb-S layers, and isolated Cs ions.

42 Kylie Zawisza
*Engineering a pH Dependent Caffeine/Anti-Caffeine VHH Interaction*
Presenter(s): Kylie Zawisza
Department: Chemistry and Biochemistry
Faculty Mentor(s): James Horn
Session Time: Session 1

The engineering of protein switches is of growing interest for life science applications. Protein switches allow reversible control of a chemical phenomenon, such as molecular recognition. Here, we explore new directions in the development of pH-dependent protein interactions through the substitution of acidic residues within anti-caffeine VHH interfaces to produce pH-dependent caffeine binding. Specifically, several anti-caffeine VHH variants have been engineered where interface residues were individually substituted with either aspartic or glutamic acid. Using isothermal titration calorimetry, variants were evaluated for their observed binding constant at pH 4.0 and 7.4 to determine the degree of pH dependence. Overall, this work opens new possibilities in the design of pH-dependent protein interactions, as well as enhances our fundamental understanding of proton-linked protein binding events.
Boron Neutron Capture Therapy (BNCT) is a current research that promises a new and effective form of cancer treatment. It involves killing tumor cells using Boron containing compounds, such as carborane. Boron undergoes fission (the action of splitting something), releasing an alpha particle and a lithium ion. The goal of this process is to kill the tumor cell without damaging any healthy cells. To make this process effective, a boronated compound can be attached to a delivery agent, such as a protein, carbohydrates, lipids, and/or nucleic acids. Once in the body, tumor cell will take agent-containing carborane and with the aid of an outside source, the reaction will be activated to kill the tumor cell.

The synthesis of carborane carboxylic acids is an area a great focus for BNCT. The purpose of this research is to make a fully functioning delivery agent for this cancer treatment. In order to make this agent, a carborane cage has to be functionalized first. For this investigation, carboxylic acid is the functional group that will be attached to a methyl-carborane cage. The functionalized cage will then be reacted with adenine, which is expected to be the delivery agent for BNCT.

Aquaporin-0 is a transport protein found in the cell membranes in the eye. It transports water in and out of the cell, which regulates eye pressure. Mutations in the protein can cause cataracts. In order for us to further understand how these mutations come about, we must know the structure of aquaporin-0. Our objective has been to demonstrate the value of using molecular dynamics to calculate the structure factor of aquaporin-0 without the influence of water. For this project, we have simulated the molecular dynamics with the computer programs VMD and NAMD. The aquaporin-0 was solvated by putting a box of water surrounding the protein and running simulations. VMD and NAMD then construct structure functions to analyze where large groups of atoms are located. We have found the method of molecular dynamics to be useful in understanding the structure of a molecule by looking at the structure factor. With continued success, molecular dynamics will open doors to a variety of methods for studying structures and will be used to analyze the structure of additional molecules.
45  Jill Belluomini  
*How Mutation of Î±B-Crystallin Protein Affects its Structure and Aggregation*

Presenter(s): Jill Belluomini  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Ralph Wheeler  
Session Time: Session 3

The human small heat shock protein Î±B-crystallin is found in the eye lens, skeletal muscle, cardiac muscle, and brain. Acting as a chaperone protein, Î±B-crystallin helps prevent aggregation of denatured proteins in these tissues. Therefore, Î±B-crystallin is a biomarker for diseases resulting from protein aggregation in these tissues, including Alexander’s, Alzheimer’s, Parkinson’s, myofibrillar myopathy, desmin-related cardiomyopathy, and dilated cardiomyopathy. Consequently, mutations of Î±B-crystallin are implicated in Alexander’s, Alzheimer’s, cataract, and desmin-related myopathy. However, Î±B-crystallin’s structure in water has not been fully determined due to its formation of oligomers containing varying numbers of monomers. Therefore, this study attempts to model computationally the structures of the Î±-crystallin domain dimers of the wild type and R120G mutation of human Î±B-crystallin. Modeling the structures of the wild type and R120G mutation of Î±B-crystallin is conducted by performing molecular dynamics computer simulations using the computer program Nanoscale Molecule Dynamics. Simulations of the wild type and R120G mutation of the Î±B-crystallin dimer start from experimental X-ray studies of the protein’s solid-state structure. Structures calculated in water are then tested by calculating the resulting structure factors and comparing them with experimental small-angle X-ray scattering data. Currently, molecular dynamics computer simulations are being conducted on the wild type and R120G mutation of the Î±B-crystallin dimer. After these simulations have been conducted, it is expected that the calculated structure factors of Î±B-crystallin’s wild type and R120G mutation will show differences due to different structures of the dimer interfaces between dimers in the wild type and R120G mutation of Î±B-crystallin.

46  Kaylee Rosenberger  
*Invertebrate Responses to invasive mice on Midway Atoll*

Presenter(s): Kaylee Rosenberger  
Department: Biological Sciences  
Faculty Mentor(s): Holly Jones  
Session Time: Session 1

In this project, the effects of invasive house mice (Mus Musculus) on island invertebrates will be studied by analyzing samples of invertebrates collected from islands of Midway Atoll National Wildlife Refuge (NWR). Mice are present on one Island, Sand Island, but absent on another, Eastern Island, providing a unique opportunity to examine the differences between invertebrate abundance and community composition. The effects of invasive mice on invertebrates have not been studied in great detail; however, it is known that mice can have irreversible and devastating effects on island ecosystems. Eradication of an established invasive species can greatly affect the other populations of the ecosystem. Therefore, it is important to study the possible outcomes and effects the eradication may cause to prevent any further environmental damage and guide management and on-going restoration efforts post-eradication.
Due to current cultivation techniques, only 1% of all prokaryotic bacterial species have been cultivated in a laboratory. There is extremely high potential for these uncharacterized microorganisms, often referred to as microbial “dark matter”, to play an important role in the fields of industry, medicine, and agriculture, encouraging microbial ecologists to fully unveil as many of these microbes as possible.

JL-ETNP-Z39 is a putative phylum of microbial dark matter organisms that have been previously identified in environmental samples from diverse aquatic environments. Among these environments are deep sea mud near Japan, the eastern tropical North Pacific Ocean, ocean drilling core samples from the Shimokita Peninsula of Japan, an intertidal mud flap near Brunei, and the sediment of an aquifer adjacent to the Colorado River, CO, USA. The focus of the current study are additional members of the JL-ETNP-Z39 candidate division that were collected from marine sediment from the Northeastern Atlantic Ocean in July of 2014. Following collection, seven individual cells were isolated using flow cytometry and sequenced after multiple displacement amplification of their genomes. These cells were then analyzed in order to build the best complete picture regarding the basic genome statistics, phylogenetic relationships, core genome, metabolic properties, and potential impact on nutrient cycling for these cells, and potentially other members from the largely undescribed phylum, JL-ETNP-Z39.

The intention of working with polymers and proteins is to see the relationship between them. By knowing how they work with one another along with BSA solutions can help with drug delivery and enhancing nanomedicine of today. How they react varies on the concentration of the BSA solution, which is what is primarily being analyzed. Polymers and proteins need to be in a water-based solution to produce natural and calming results. If they are mixed with other solutions that are not water-based, a chemical reaction will occur which is not be beneficial for drug delivery. As stated, the solution must be water based, but not only just water. If only water is used, the polymer will slowly turn into a solid ball. This is when HEPES, DMF and BSA solutions should be added into the water solution to try to stabilize the polymer. The polymer we are working with is called P4672-2VPtSH. The most important component is adding protein to the solution. The protein that is being used is poly(4-vinylpyridine) also known as P4VP. When protein is added, the polymer becomes more stable by reducing the energy of the polymer These components and, mainly the proteins, will reduce the polymer energy, making it less likely to become one solid ball.
Amphetamines are internationally one of the most commonly used class of illegal drugs, with over 1.6 million users in the United States alone. Of the amphetamines, methamphetamine (MA) is a highly addictive, potent neurotoxin to cells within the central nervous system. Long-term MA use is associated with many negative effects, including impaired impulse control, memory, decision-making and motor coordination. These impairments are, at least in part, due to its neurotoxic effects on neurons that contain dopamine, a chemical messenger, or neurotransmitter, in the brain. Damage to dopamine neurons is initiated by MA acutely releasing excess dopamine, which is eventually oxidized into highly toxic ions, leading to long-term damage to dopamine neurons. Hypothermia caused by MA can also contribute to the neuronal damage. Our laboratory has previously found that repeated exposure to MA results in hyperthermia and dopamine depletion in the striatum in male rats. However, there is far less existing data on female response to MA in rats despite the reports that females are more likely to prefer MA than males and their use escalates more quickly. Therefore, the purpose of this study is to measure the acute thermic response to 4 doses of MA (0, 2.5, 5 or 7.5 mg/kg) and to assess the long-term neurotoxicity to dopamine neurons. It is expected that increased exposure to MA will lead to higher levels of thermic response as well as long-term neurotoxicity to dopamine neurons.

Cyclic nucleotide monophosphates cyclic AMP (cAMP) and cyclic GMP (cGMP) are molecules vital for processes such as smooth muscle mobility. The molecules, cAMP and cGMP are hydrolyzed to AMP or GMP by the enzyme phosphodiesterase (PDE). However, by introducing a PDE inhibitor, the enzymes that hydrolyze the cyclic phosphates cAMP and cGMP can be “turned off” and thus, increase the concentrations of cAMP and cGMP. PDE inhibitors have been identified as therapeutics in areas such as erectile dysfunction, pulmonary arterial hypertension, psoriasis, plaque psoriasis, chronic obstructive pulmonary disease, coronary heart disease, dementia, depression, and schizophrenia. There are eleven families of PDE enzymes termed PDE1 through PDE11. This poster will describe the synthesis of selective PDE4 inhibitors. The selective PDE4 inhibitors can be used as research tools to further study inhibition of this important enzyme.
Investigating the Effect of Antibiotic Selective Pressure on ASCT2 Expression in Human Hepatocellular Carcinoma Cells

Presenter(s): Isabella Guizzetti
Department: Biological Sciences
Faculty Mentor(s): Barrie Bode
Session Time: Session 1

The CRISPER Cas-9 system is a recently discovered and 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 in the absence and presence of puromycin and assessed for ASCT2 protein expression at one-week intervals over a 3-week period. Surprisingly, ASCT2 expression reemerged in the Huh7 but not in the SK-Hep1 cells, which suggests that the ASCT2 gene may have been completely knocked out only in the SK-Hep cells. The Huh7 cells maintained under selective pressure (puromycin) also exhibited even higher levels of ASCT2 expression, as well as a higher MDR1 expression, than did Huh7 relieved of the pressure, which might explain why Huh7 but not SK-Hep1 were able to avoid comprehensive ASCT2 knockout. The results suggest that care must be taken to ensure complete knockout of CRISPR-Cas9 targeted genes, especially when targets are implicated in cancer and tumorigenesis. They also suggest that higher MDR1 expression in Huh7 relative to SK-Hep1 might explain why Huh7 were able to evade complete transporter knockout, and SK-Hep1 were not. Ongoing studies are currently addressing whether ASCT2 re-emerges in Huh7 ASCT2 knockout cell-generated tumors in mice.

Highly Fluorescent Flexible and Stretchable Conjugated Polymers

Presenter(s): Blake Mirman
Department: Chemistry and Biochemistry
Faculty Mentor(s): Sang Youm
Session Time: Session 4

Due to high crystallinity and rigidity of the planarized π-electron conjugated backbone, conjugated polymers typically are brittle, and break upon stretching. This brittleness is a major impediment for their practical applications, and, therefore, development of highly stretchable, elastic conjugated polymers for use in flexible electronic and optoelectronic devices still remains a challenge. In this project, a highly flexible, rubber-like PPEV (poly(para-phenylene ethynylene vinylene)) conjugated polymer was prepared by a novel metal-catalyzed polymerization method. PPEV has a unique property that makes the polymer to increase its fluorescent emission when stretched. We have demonstrated that the polymer is able to increase fluorescent emission up to 160% strain at which point the emission intensity begins to decline. The spectroscopic properties were studied using UV/vis absorbance and fluorescence spectroscopy. We need further studies (which are ongoing) to understand and explain this phenomenon. This novel flexible conjugated polymer has the potential to be used in a plethora of ways. Such as the use of a strain sensor, and has the potential to be mixed into a polymer solution to be used as an indicator. Another important application to be investigated is in fabricating flexible organic polymer light emitting devices.
James Holmes

Determining the pH dependency of maltose-MBP interaction

Presenter(s): James Holmes
Department: Chemistry and Biochemistry
Faculty Mentor(s): Jim Horn
Session Time: Session 1

Amino acids are the foundation to all living things in life. Be it plants or animals, cellular animals, or more complex species, all species rely on their genes which are made up of a series of codes/structures that connect together to build and form the structures of our cells and organs. Maltose binding hasn’t been studied enough to see or prove that there is a relationship between its ability of binding affinity and Ph levels. We do know of other variables that do play a major role in maltose binding, for instance Salt denaturing something inhibiting it’s ability to bind.

Michelle Norberciak

Functionalization of Boron Nitride Nanotubes for BNCT

Presenter(s): Michelle Norberciak
Department: Chemistry and Biochemistry
Faculty Mentor(s): Narayan Hosmane
Session Time: Session 4

The research objectives include the following. (1) To functionalize boron nitride nanotubes (BNNT) for treatment of Glioblastoma Multiforme (GBM) brain tumors in application to Boron Neutron Capture Therapy (BNCT). (2) The covalent modification of BNNTs with biomolecules will be affixed to the surface of the boron nitride nanotubes, changing the surface chemistry, and increasing the binding affinity to the targeted cancer cell receptors. (3) To investigate and compare several types of biomolecule conjugates for BNNT (i.e. amino acids, glucoses, nucleic acids, etc.) to increase the concentration and biodistribution of the BNNT into the cancer cell. If functionalization of BNNTs is successful, this research will help to develop a new class of drugs, based on b-10 enriched bioconjugates, for medical applications of BNCT.
55 Emily Fiala

*Evaluation of Thermal Shift Assay Conditions to Assess Potential Inhibitors of EcIspE from the Non-Mevalonate Pathway*

Presenter(s): Emily Fiala  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): James Horn, Timothy Hagen  
Session Time: Session 3  

Inhibition of enzymes in the non-mevalonate (MEP) pathway is of high interest for therapeutic intervention because of its prevalence in bacteria and other pathogenic organisms. Inhibition of this pathway prevents the production of isoprenoid precursors, isopentyl pyrophosphate (IPP) and dimethylallyl pyrophosphate (DMAPP), which are vital building blocks for many biological functions. This project focuses on the determination of binding interactions between IspE, the fourth enzyme in the MEP pathway, and potential small molecule inhibitors. A fluorescent thermal shift (FTS) assay was used as a screening method to evaluate IspE/inhibitor interactions by observing the change in the enzyme’s melting temperature (Tm) in the presence of potential inhibitors. To explore whether IspE’s Tm could be reduced, denaturants were included in the assay buffer, which resulted in lowering the Tm by up to 14 degrees. These conditions were then used to measure thermal shift values for compounds with known binding constants against IspE. Comparisons between thermal shift values for the different experimental assay conditions and binding constants will be discussed.

56 Oreana Teran

*Synthesis of Fluorescein-Tagged 1-phenyl-o-carborane for Boron Neutron Capture Therapy*

Presenter(s): Oreana Teran, Ausem Kattom  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Narayan Hosmane  
Session Time: Session 4  

A crucial component of treating malignant tumors is to destroy the cancerous cells while preserving the healthy cells. A current form of cancer treatment is chemotherapy which has been ineffective at treating high-grade brain tumors such as glioblastomas. There is evidence to suggest that there are new methods to safely deliver drug agents to the tumor site without causing harmful side effects. Boron Neutron Capture Therapy (BNCT) has been shown to be a promising binary radiation therapy for treating cancer which uses the readily stable boron 10B isotope. Ortho-carboranes are possible biological carrier molecules for target drug delivery due to their high lipophilicity. In this experiment a carbonyl-fluorescein conjugate (1-phenyl-o-carborane was synthesized via Fischer Esterification under standard conditions. This reaction was analyzed using a variety of characterization and analytic techniques. The results of this experiment will evaluate the cellular uptake of the boron carbonyl-fluorescein conjugate in cancerous cells. Moreover, this work will further examine the potential of a new drug delivery-agent for Boron Neutron Capture Therapy.
**57 Joseph Thomas**  
*Showing Up: Class Attendance and the Theory of Planned Behavior*  
Presenter(s): Joseph Thomas  
Department: Communication  
Faculty Mentor(s): Mary Lynn Henningsen  
Session Time: Session 1

The purpose of this study is to explore the link between college students' intentions to attend class and actual attendance behavior. Four unique messages were designed to target each element of Ajzen's theory of planned behavior (TPB; 1985). These include attitudes toward the behavior, subjective norms, perceived behavioral control, and behavioral intention. A sample of Northern Illinois University students were randomly assigned to message condition and then completed a questionnaire assessing persuasiveness, attitudes, subjective norms, perceived behavioral control, behavioral intentions, and actual attendance behavior. From a practical standpoint, the goal of this study is to inform campaigns as to what persuasive tactics work best to increase class attendance.

**58 Diana Kazimierski**  
*Inhibition of Burkholderia pseudomallei*  
Presenter(s): Diana Kazimierski  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Timothy Hagen  
Session Time: Session 4

The Methylerythritol Phosphate Pathway is present within bacteria but not in mammals. IspF is the fifth enzyme that exists within the Methylerythritol Phosphate Pathway of bacteria and is necessary for isoprenoid synthesis. The binding site of the IspF enzyme contains a catalytic zinc ion, which is capable of being inhibited by ligands that contain a sulfonamide functional group. Our research group recently discovered that the sulfonamides; dansylamide, acetazolamide, and ethoxzolamide bind to the IspF enzyme. These sulfonamides are capable of binding to the active site of IspF through the zinc ion. Dansylamide is a fluorescent compound that binds to the active site of IspF and it can be utilized in a fluorescent ligand binding assay. Binding affinities for the fluorescent compounds were determined by fluorescent anisotropy. Analogs that demonstrate enzyme inhibition can potentially be used as a new class of anti-infective drugs that target IspF.
Due to the volatile nature of financial markets, creating accurate forecasts for financial assets is currently a rather difficult undertaking. To counter this difficulty, financial firms are employing Recurrent Neural Networks (RNN), which are machine learning models that can forecast time series data. Although RNNs have been shown to provide higher accuracy in forecasting time series data as compared to traditional models such as AutoRegressive Integrated Moving Average (ARIMA), RNNs come with their own issues.

Before they can forecast with any accuracy, RNNs have to go through a training process in which they analyze the data and then make a function expressing said data. During this training process, the model can easily become corrupted by two issues called exploding and vanishing gradients. Exploding gradients cause an overflow in the error calculation and vanishing gradients cause an underflow in the error calculation. This causes the neurons in the network to become oversaturated which prevents them from being able to retain information and learn new information. Therefore, these two issues prevent RNN models from properly analyzing the data and thus an accurate forecast can not occur.

In an attempt to counter these problems, I propose a new activation function called the Noisy-Exponential Activation Function (NEAF). NEAF will attempt to prevent neuron saturation which damages both the information capacity and the learning ability of a neural network as discussed above.

The purpose of the research is to test whether a chatbots, such as, Alexa or Siri, can be created to teach a student about a certain topic better than the student trying to self-learn. A person who is self-taught generally has no previous knowledge about a topic and are attempting to teach themselves about the topic. A person is better off being able to learn from such technology where a bot can teach them about any specific topic, rather than by being stressed about attempting to learn a new topic by themselves. Learning a topic where they have no background knowledge can be difficult and lacks accuracy. When a learner has someone to teach them, it saves them time and effort while giving them an outcome that is efficient. The outcomes are expected to be that these bots will enhance the learning of those that need help but are unable to get receive it.
61 Theresa Li
Stereo Vision in the Clouds
Presenter(s): Theresa Li
Department: Computer Science
Faculty Mentor(s): Kirk Duffin
Session Time: Session 3

This research's purpose is to create three-dimensional images of clouds using high dynamic range cameras. This concept is known as stereo vision. An example of it is if you were to stick out your thumb and close one eye briefly then the other, you would see your thumb jumping around in the background, proving your right and left eye are taking in two different images and combining them to create one 3D mental representation. Now when looking up at the clouds, they may appear 3D, but really, they are flat because the human eye depth perception doesn't reach that distance along with our eyes' limited baseline when it comes to viewing larger objects. Essentially, our eyes are “taking pictures” at different moments all the time and seeing different perspectives of stereo vision. We want to extend that to clouds by creating a stereo vision picture system. Our expected results include having a system developed that can periodically take three-dimensional representations of clouds and be displayed on an Oculus Rift or similar device.

62 Ivan Sanchez
Use of Virtual Reality for Physical Education Class Preparation
Presenter(s): Ivan Sanchez
Department: Computer Science
Faculty Mentor(s): Michael Papka, Dr. Zachary Wahl-Alexander
Session Time: Session 4

The purpose of this research is to explore the potential of virtual reality. In this project, the research will discover the impact virtual reality can have preparing future teachers. This research will specifically look to prepare Kinesiology students and provide a new approach to teaching that can greatly immerse the student and provide a more efficient way to learn. We expect the research to yield a new approach to learning with virtual reality as an immersion tool. We expect the research to yield generally favorable results to using virtual reality.

63 Alyssa Ebert
The Effects of Child Care Subsidies on Labor Force Participation
Presenter(s): Alyssa Ebert
Department: Economics
Faculty Mentor(s): Virginia Wilcox
Session Time: Session 1

The project analyzes the theory of reservation wages and the cost of working in relation to time used for leisure. The reservation wage of an individual is dependent on child care subsidies for stay at home parents, therefore effecting labor force participation.
64  Vivian Overbeck  
*The Economics of the Education of Immigrant Women in the Mid Twentieth Century United States*  
Presenter(s): Vivian Overbeck  
Department: Economics  
Faculty Mentor(s): Virginia Wilcox  
Session Time: Session 4

This economics research project studies the phenomenon of overeducation and undereducation of immigrant women to the United States in the mid twentieth century. Because people immigrating to the United States have a lower disposable income, they may be more likely to accept a job that they are overqualified for than someone who is a native born American. Additionally, immigrants often struggle with Americans not understanding the education system in which the immigrant was educated, and how that education is equivalent to an American education. This study uses US Census data from the mid twentieth century in order to compare immigrant women from the time period to native born Americans, and how their levels of education compare to the jobs they are able to obtain. Other factors that may influence the overeducation or undereducation of immigrant women include marital status, work experience, and language skills.

65  Kristen Edgar  
*Campus Sustainability Survey*  
Presenter(s): Kristen Edgar, Siyu Tao, Collin Cabangal  
Department: Environmental Studies  
Faculty Mentor(s): Colin Kuehl  
Session Time: Session 1

NIU has made great changes in past few decades to become more sustainable thanks to the efforts of the Green Team, environmental focused student groups, and the entire environmental studies department. Over the past year, STARS certification through the Association of the Advancement of Sustainability in Higher Education (AASHE) was one of the goals for the University. A central component of the STARS certification is a campus sustainability survey. Qualtrics Software was used to create a survey consisting of questions relating to people’s knowledge, attitudes, and behaviors regarding sustainability. The survey was distributed and accessible to all students, faculty, and staff for a set duration. About 1,000 respondents completed the survey for viable results, which will be available for the university, stakeholders, and other departments for future policies and issues revolving around becoming a more sustainable campus.
In general, this paper focuses on how federalism is the root of these interesting relationships between states and localities that only become more complex as localities attempt to progress against what the current federal administration, especially when it comes to environmental efforts that grow increasingly controversial with growing political polarization. Therefore, this research paper is structured like a law review to accomplish a few objectives to explain the how localities can have power with environmental efforts in an era full of state preemption. First, there is a recollection of how and why there is an increase of states preempting municipalities over local environmental efforts, what home rule is, types of state preemption, and how it is making local efforts difficult to succeed. Secondly, there is a focus on Wisconsin as a case study that details specific preemption and legal conflicts happening for local environmental issues there (factory farming, plastic bags, and pesticides). Thirdly, the paper analyzes the legality of these situations and offers possible solutions that could apply to Wisconsin, but also to the plethora of other localities experiencing similar issues. Overall, Wisconsin serves as a prime example for state preemption since most cases happen when a state is dominated by one political party while the locality is another political party, which is why potential solutions could aid other localities now and in the future.
67 Kayla Koenig

Assessment of Kishwaukee River Water Quality for Aquatic Life and Human Health

Presenter(s): Kayla Koenig, Nicholas Grey, Andrea Marquardt
Department: Environmental Studies
Faculty Mentor(s): Tomoyuki Shibata, Melissa Lenczewski
Session Time: Session 1

Objective: The objective of this study was to assess the water quality of the Kishwaukee River for aquatic life and human health. The study also addresses potential impacts on water quality from surrounding environment and seasonal effects.

Methods: A total 127 water samples collected at 18 sites along the South Branch of the Kishwaukee River watershed in DeKalb County were tested for physico-chemical parameters seasonally over ten months since May 2018 to March 2019.

Results: Overall, tested river water qualities met the U.S. Ambient Water Quality Criteria for both aquatic life and human health, except for pH. Twenty-three samples (e.g. 4 in Fall and 19 in the Winter) exceeded a healthy aquatic range of 5.0 - 9.0. Of all the tested compounds, sulfate was the only compound significantly different between surrounding environments (e.g. highest in the agricultural and lowest in urban areas; p = 0.03). Nitrite, nitrate, hydrogen sulfide, pH and phosphate were all measured significantly differently in the seasons (p < 0.01). When analyzing if a riparian zone in an agricultural landscape filters out any compounds, one important difference of nitrite compound was found. The zones without a riparian zone came back with a higher number than areas with a riparian zone.

Conclusion: The season has a higher effect on water quality than the surrounding environment or whether a riparian zone is present. The pH was the only value that was found to be outside of a healthy aquatic range, mostly occurring in colder seasons.

68 Kevin Doom

Flood Fatalities in the United States

Presenter(s): Kevin Doom
Department: Geography
Faculty Mentor(s): Ashley Walker
Session Time: Session 4

Flood events currently account for more weather-related fatalities annually than any other atmospheric hazard in the U.S. Moreover, floods are the only weather-related event that has seen a steady rise in resulting fatalities over the past 30 years. Despite this assertion, a comprehensive and accurate accounting of recent flood-related fatalities in the U.S. is lacking. The purpose of this study is to explore the spatiotemporal distribution of flood fatalities throughout the U.S. from 2006 through 2018. Results reveal that most flood-related deaths occurred throughout Appalachia and in Texas. Findings will also reveal the temporal distribution (e.g., month, year-by-year) of flood fatalities, as well as trends found in victim characteristics such as age, gender, and location or circumstance at the time of death (e.g., camping, in a vehicle, in a manufactured home, etc.). Males were found to be the prominent victims, and most of flood fatalities occurred as a result of rapid-onset, flash flood events and were generally affiliated with vehicles traversing flooded roadways. Results highlight the specific vulnerabilities and impacts associated with flood events that affect the nation each year. A more complete analysis of fatalities associated with these events is essential to improving education and mitigation efforts concerning these deadly natural hazards.
Sarah Shapley
Formation of Metallic Deposits at High Temperature and High Pressure.
Presenter(s): Sarah Shapley
Department: Geology and Environmental Geosciences
Faculty Mentor(s): Mark Frank
Session Time: Session 1

The intrusion of granitic (s.l.) magma at shallow depths (2-10 km) within the continental crust results in the development of large hot water circulation systems that can produce mineral alteration and metallic ore deposits. Copper (Cu) and gold (Au) are important metals in these deposits. Metals transported from the magma by the magmatic volatile phase (MVP) and precipitate in the rocks surrounding the magma due to temperature, pressure, or fluid composition changes. Copper is commonly found in the minerals chalcopyrite (CuFeS2) and bornite (Cu5FeS4), whereas gold is found as native gold metal. This project seeks to understand the role of the fluid in transporting the metals to places of depositions.

Experimental studies have demonstrated that copper and gold can complex with chloride in the fluid and form CuCl and AuCl2H, respectively. Although observed minerals of deposition (CuFeS2, Cu5FeS4 or Au) are sulfur-rich, few studies exist on the ability of sulfur to complex with and transport the metals. I hypothesized that Cu and Au can complex with S (HS- or S2-). The variables tested were temperature, HS- (as H2S) concentration, and salinity of the MVP. Experiments containing gold + MVP + chalcopyrite Â± pyrrhotite Â± bornite were conducted at 500-700 Â°C and 50-100 MPa; conditions typical for these systems. The data showed H2S had no discernible correlation with metal concentrations in the MVP, however, temperature and salinity were positively correlated with metal concentrations. Experiments varying HCl concentrations are in progress to better constrain the relationship between metal concentrations and Cl.

Gabriel Sonntag
The Beginning of Gay Liberation at NIU: Lesbian and Gay Huskies in the 1970s and 1980s
Presenter(s): Gabriel Sonntag
Department: History
Faculty Mentor(s): Amanda Littauer
Session Time: Session 3

This research paper was written as a part of HIST 495: Senior Thesis, the capstone undergraduate history class which tasks students to write an article-length paper based on their own original research. Written and researched over the course of a semester, this paper examines Northern Illinois University’s Gay Liberation Front (GLF), NIU’s first gay and lesbian student organization. The paper asks how leadership, community members, events, and resistance shaped NIU’s GLF as it grew from a budding student organization to an important center for gay and lesbian life at NIU. The sources that I examined come from NIU’s University Archives as well as the Gender and Sexuality Resource Center’s library. The four boxes that I used from the University Archives included sources such as meeting minutes, office logs, event posters, flyers, and letters. The Gender and Sexuality Resource Center’s library has archived copies of the Pride Letter, a newsletter published by the GLF. Through examining the sources, I concluded that while the GLF struggled to provide a social outlet for all members of the LGBTQ community, the GLF successfully provided substantial programs for its members and overcame homophobic resistance that it faced both on- and off-campus. Few historians have written about gay and lesbian student organizations, and none have specifically written about the Gay Liberation Front at Northern Illinois University. Therefore, this research paper has importance in both local history as well as LGBTQ history.
71  Ainsley Galvez

*Then and Now: How Northern Illinois University’s Health Services Changed Throughout the Years.*

Presenter(s): Ainsley Galvez  
Department: History  
Faculty Mentor(s): Beatrix Hoffman  
Session Time: Session 1

This project examines the history of student health services at Northern Illinois University. Since hiring their first nurse in 1912, NIU Health Services have gone through many changes in their attempts to better serve the student population. In the twentieth century, NIU was hit by epidemics of flu and polio, changed from a women’s college to a co-educational institution, and faced rising medical costs. Student Health Services has evolved to meet these new challenges and opportunities.

72  Jeremiah Knoll

*“Still They Tempt Us”: Confederate Resistance Strategies in Union Prisons*  
Presenter(s): Jeremiah Knoll  
Department: History  
Faculty Mentor(s): Brian Sandberg  
Session Time: Session 3

Of the tens of thousands of Confederate prisoners of war held in the Midwest during the Civil War, nearly all were faced with the temptation to gain their freedom by either taking an oath of allegiance to the Union or joining the Union army as “galvanized Yankees”. This research project seeks to define and examine the resistance strategies utilized by Confederate prisoners of war when faced by Union attempts to convert their allegiance. These strategies are divided into two categories: active resistance strategies and passive resistance strategies. Confederate prisoners’ active resistance strategies are comprised of their attempts to escape, which allowed them to bypass the prisoner exchange cartel in returning to their armies and forced the Union to divert troops and resources in attempts to recapture escaped prisoners. For those prisoners who remained in the prisons, their passive resistance strategies included refusal of work assignments, the deliberate breaking of prison rules, and efforts to make the prison lifestyle more similar to that of the camp lifestyle the prisoners were accustomed to. This project also examines the various Union attempts to counter these resistance strategies, as well as Confederate prisoners’ views on the “traitors” that did not resist Union attempts to gain their allegiance. Although resistance strategies and Union responses varied from prison to prison, commonalities found through research of the diaries, journals, memoirs, and letters of Confederate prisoners of war allow for conclusions to be drawn about the Midwestern prisoner of war experience as a whole.
The study of conspiracy theories can shed light onto how we acquire and justify our beliefs via trust. There is an ongoing debate on whether conspiracy theories are intrinsically irrational due to “…manifestations of a latent psychopathology, a product of gross misinformation, or a crippled epistemology” (Oliver & Wood, 953). I assert that the claim that conspiracy theories are intrinsically irrational is unsupported by the evidence.

Conspiracy theorist are often irrational in holding conspiracy theories. Conspiracy theories can seem plausible but only if social and political institutions are untrustworthy. The lack of trust of conspiracy theorist towards political and social instructions is generally unfounded. As a result, conspiracy theorists are often irrational in their theorizing.

It is important to know that trust can be cultivated through an attitude of trust by mimicking in our attitude toward other people an effort to be more trusting (McLeod, 2015). If conspiracy theorists continuously reject any trusting relationship with their social and political institutions, this may be because they do not allow trust to be cultivated in that relationship. Throughout the paper, I will argue that it is the irrationality on the part of the conspiracy theorist that is problematic for conspiracy theories through a series of case studies of famous conspiracies such as the Flat-Earthers and the Oklahoma City Bombing.

The Bracero Program imported seasonal Mexican farm laborers on working contracts during World War II due to a shortage of farm laborers. The program continued even after the war had ended, which created tension between American farm laborers and braceros. Over the years, the program became more and more unpopular among Southern Americans. Operation Wetback was a series of mass deportations of Mexican nationals that began shortly after the Bracero Program began failing. Operation Wetback was the United States’ response to an increase of Mexican nationals. Operation Wetback was a turning point for Immigration and Naturalization Services; paving the way for an increase of militarization of the INS and Border Patrol. This paper will review the methods the INS and Border Patrol used to find, round up, and deport Mexican nationals and how it differed from previous years. Deportations were extremely rare in the 1950s and INS never focused on enforcement. The 1950s deportations were a pivotal time for the Immigration and Naturalization Services. I will focus on the location and the demographics of the detainees. I will also analyze immigration and labor policy that gave USCIS the power and privilege to take charge of immigration services.
In May 1970, Northern Illinois University students reacted to the massacre of 4 Kent State students. Like other schools across the nation, students found ways to grieve and express their frustrations through destructive demonstrations and peaceful protest. This presentation is based on a research paper written for HIST 495: Senior Thesis. The paper examines how themes of tension and powerlessness within the student population provided a perfect ignition point for the events of May. The paper seeks to explore the ways in which students used unorganized and organized protests and demonstrations to speak out against the issues they saw within the university and the nation. While small groups of students raged with violence and destruction, other students managed to gather large crowds for peaceful protests against police violence in the United States and military violence in Vietnam. Students compounded issues of race, war, the rights of students, and police brutality to fuel their protests. As the month ran on, NIU administration was forced to consider discontinuing the ROTC program as well as how to safely address the dangers presented to and by students. Researching this topic relied heavily on the NIU University Archives collections of university news reports, student newspapers, interviews with participants and spectators of the protests, as well as the Northern Star archives.

This project focuses on studying solutions to certain equations. The solutions sought are whole numbers. The equations considered in the project are certain Diophantine equations. The equations are created with two variables and set equal to a whole number in varying forms. The solutions to these equations are supposed to be positive whole numbers if solutions exist. The moniker “Diophantine Equations” is homage to later Greek mathematician Diophantos who worked on many mathematical concepts in Alexandria around A.D. 250. During the time of Diophantos and ancient Greece, all of the problem solving had to be done by hand. This project will be continuing last years project and data by automating the Magma Computational Software that we are using.
77  Eli Brottman  
*A Computational Approach to Bring Vegetables to Food-Insecure Persons*  
Presenter(s): Eli Brottman  
Department: Mathematical Sciences  
Faculty Mentor(s): Nathan Krislock  
Session Time: Session 4

We all know that vegetables are an important component of a healthy diet. Yet, they are often not accessible to food-insecure persons, or at least not at affordable prices. While there are food pantries and other sites distributing food to in-need individuals, those resources are limited. The aim of this research is to determine how to most effectively distribute vegetables, from the national supply, to these communities, such that the costs are minimized. To do so, a stochastic linear programming model of this transportation problem is employed, which will be solved by the JuMP package of the Julia software. Not only will the deterministic and stochastic solutions to this problem be compared, but in the optimal case, the dual problem will also be analyzed; that provides the shadow prices of the commodities, which will help to determine where growth should be altered in order to reduce costs.

78  Victoria Kwaben  
*Worthful Waste: College students’ attitudes towards composting on campus and its feasibility*  
Presenter(s): Victoria Kwaben  
Department: Other  
Faculty Mentor(s): Eimileanne Delaney  
Session Time: Session 1

The purpose of this research is to demonstrate the advantages of composting on the campus of Northern Illinois University, how it may function and the feasibility of composting here on campus. Using descriptive and observational methods, this research assesses the basic knowledge of students and their thoughts on this project. Additionally, secondary research will be completed to explore what composting is, methods that mediate composting, the performance of schools that function in utilizing a composting system, and more. While data collection is ongoing, the preliminary results of this research have varied in expectations. The following questions were analyzed: do you know what composting is, have you seen a compost machine, would you be interested in learning more and helping compost, which of these food items below are compostable. The following questions were questioned in interviews with experienced professionals: how would implementing a composting system affect NIU’s reputation, what complications, setbacks, or difficulties could the school experience. The limitations of this research rely upon particular methods such as surveying that allow self-report bias. Other limitations include a lack of interview subjects that specifically relate and have implemented a composting system in a university. Overall, implementing a composting system will provide numerous advantages and challenges such as availability to grants, increased reputation, high expenses and vigorous training; implementing a composting system on Northern Illinois University will require more efforts in research and planning.
Children view the world through a lens that reflects their experiences and influence of family members. Previous researchers tested how maternal warmth affected a child's physical/relational victimization by peers (Yang and McLoyd, 2015; Georgiou, 2010) and the relationship between victimization and friendship quality (Bollmer, Milich, and Harris, 2005; Boulton et al., 1999). However, relatively little is known about the relationship of parental warmth, friendship quality, and physical/relational victimization, nor how gender may factor in. In the current study, these variables were investigated in a sample of mother/adolescent dyads (n=69).

T-tests for gender suggest there is only a significant difference in scores for females (M= 3.14, SD= .51) and males (M=2.61, SD=.84) for positive friendship quality; t (67) = 3.17, p=.002.

The researchers used multiple regression analyses to test the relationship between the predictors and parental warmth. First, a regression for gender and relational victimization (β= -0.37, p=0.7) was analyzed with results revealing a trend towards significance. Then, a regression for physical victimization and gender (β= -0.46, p=0.2) was conducted, suggesting that parental warmth was significant such that higher levels of parental warmth resulted in girls experiencing less physical victimization than in boys. Additionally, a regression interaction of parental warmth and positive friendship quality impacting physical victimization (β= 0.02, p=0.68) was conducted, results suggest a trend toward significance. Finally, a regression of friendship conflict and gender (β= -0.45, p=0.04) was conducted with results suggesting significance such that girls experiencing higher levels of parental warmth reported less friendship conflict than boys.
80 Robin Grooms  

Curriculum Enhancement: A Proposal for an Oral Communication Lab at NIU  

Presenter(s): Robin Grooms  
Department: Other  
Faculty Mentor(s): Judy Santacaterina  
Session Time: Session 4  

This project seeks to increase opportunities to NIU students to enhance their skills in oral communication beyond the requirements of their curriculum. A proposal for an oral communication lab has been developed in order to support future career and academic success. A program analysis of the interest and practicality of an oral communication lab was conducted based on analyses of current programs, a survey of students, and dialogue with students after individualized coaching. The Writing Center and Career Services, as well as other universities’ programs have provided quality models for the implementation of this proposal. The lab would provide a variety of services open to all students in a centralized location in a consistent format. Survey results demonstrate an interest from NIU students in the potential services, individualized structure, and skill building resources available from an oral communication lab. One-on-One coaching or advising has been demonstrated to increase the confidence and effectiveness of oral communication in students. The Co-curricular Forensics Program and their staff of experienced coaches provides a strong proven template for highly individualized one on one coaching. Using their methods and the methods of the writing center tutors, the knowledge base for instruction of students is available for more clear and centralized coaching of NIU students. Through compiling the survey data, completing a NIU Prioritization Criteria Questionnaire, sample service templates, and compiling potential funding sources, this program is ready to take the next step in conducting a pilot program in upcoming semesters.

81 Sarah Castle  

The Moral Relevance of the Doing and Allowing Harm Distinction  

Presenter(s): Sarah Castle  
Department: Philosophy  
Faculty Mentor(s): Jason Hanna  
Session Time: Session 3  

This paper will address the moral relevance of the distinction between doing and allowing harm. To those unfamiliar with contemporary deontology, this distinction matters because the theory centers around the principle that we ought not to do harm. Some philosophers assert that an instance of allowing harm (e.g., letting die) is permissible whereas the case of doing harm (e.g., killing) is impermissible. For example, most people think it is permissible to withdraw life-sustaining treatment (a case of letting die), but active euthanasia is far more controversial (a case of killing). Furthermore, many of us fail to do all that we can to save others (e.g., donating to famine relief). We tend to think that this is probably permissible, though we do not think it would be permissible to kill others simply because it is in our best interest to do so.

In this paper, I will explore and analyze the distinction between doing and allowing harm and its moral significance within deontology through reviewing the present literature. I will examine theories that posit that the distinction is morally relevant because it helps maintain an appropriate balance between positive and negative rights. Then, I will apply these theories onto controversial biomedical topics such as abortion. The paper will conclude with my endorsement of a deontologically-based theory that maintains the doing versus allowing harm distinction based on its protection of negative rights.
82 Lucile Johnson
The Sensory Experience of Joan of Arc
Presenter(s): Lucile Johnson
Department: History
Faculty Mentor(s): Valerie Garver
Session Time: Session 2

My project is about Joan of Arc and discovering if the senses played into the fact that she had visions of Saints and her mission to crown Charles the proper king of France. The research is through looking at the medieval perception of the senses and comparing them to the ones Joan had, as well as looking at her trial and other primary sources.

83 Anna Rdzok
Idealism, God, and Spinoza: Combining Views
Presenter(s): Anna Rdzok
Department: Philosophy
Faculty Mentor(s): Craig Warmke
Session Time: Session 4

In metaphysics, there is debate over what reality is fundamentally made of. This research intends to add to the conversation within idealism (the view that the world is fundamentally comprised of mental qualities, or ideas). The biggest historical proponent of idealism, George Berkeley, faces serious challenges to his view due to his heavy reliance of the existence of God. To avoid these problems, Helen Yetter-Chappell proposes a new framework, which replaces God with an external reality comprised of a unity of consciousness, or a phenomenal tapestry. However, she leaves open many possibilities as to what exactly this tapestry is, and how it comes to be. This paper attempts to fill this openness by combining the phenomenal tapestry with an idealist reframing of Spinoza’s concept of God, or Nature. I argue that it is possible to combine the two, by showing parallels between Yetter-Chappell’s tapestry and Spinoza’s account of God, and by resolving the tension between Spinoza’s supposed naturalism (the view that the world is fundamentally comprised of physical, or material objects), and Yetter-Chappell’s idealism. I also argue that combining the two theories provides several substantial benefits. These benefits include: resolution of internal issues in both Yetter-Chappell and Spinoza, an account of where reality comes from, and increased explanatory power against competing materialist accounts.
Silicon Photomultipliers (SiPMs) play an integral role in ensuring the background signal control in the Mu2e experiment. Mu2e, which hopes to study CP violation via muon decay into an electron through a rare, yet unobserved pathway. To achieve sensitivity, a Cosmic Ray Veto will play a role in monitoring background signals from cosmic rays which could interfere with the desired signal. The SiPM acts as the front-end detector electronic for the CRV, responding to photons produced by cosmic rays passing through a scintillating material. A significant number of the SiPMs in Mu2e will be exposed to high doses of ionizing radiation, significantly reducing their performance and pushing them out of what is deemed acceptable by Mu2e’s stringent design specifications.

Thankfully, there is a way to mitigate some radiation damage incurred by the SiPMs. A few annealing processes appear to alleviate some of the radiation damage. This research seeks to investigate those processes.

This research project will study the electric field distribution of x-rays propagating within a planar silicon waveguide. The electric field will be modeled using two methods. The simpler, but more approximate method will be to consider the propagating modes of an infinite planar waveguide, which can be calculated analytically. The coupling of x-ray’s propagating into and out of the waveguide will be estimated by calculating the overlap integral between the freely propagating electric field modes and the modes of the infinite waveguide. A second, more exact, method will be numerically solving parabolic wave equations to describe propagation of x-rays near the entry and exit points of the waveguide. Graphing and numerical calculations will be made using the Python programming language. The waveguide material will be modelled as single crystal silicon, and the interior of the waveguide will be modelled using two possible materials, air and water. Initial calculations will be made using air as the guiding medium and will then be compared to measured x-ray data. The same calculations will then be done with water as a guiding medium. The outcome of this project is to be able to provide a model for understanding the scattering of x-rays from materials confined within a waveguide. One material under consideration for such studies are phospholipid membranes supported on silicon, which are considered a useful model of the eukaryotic cell membrane.
86 Ben Skipor
Grassroots Democracy in Chicago’s Near Southwest Side
Presenter(s): Ben Skipor
Department: Political Science
Faculty Mentor(s): Beatrix Hoffman
Session Time: Session 1

The Pilsen Neighbors Community Council (PNCC) was developed in the predominantly Czech community of Pilsen in the 1950s. As Pilsen shifted to become a center for the Mexican community of Chicago, the PNCC shifted its goals to meet the needs of the new community. The PNCC worked to effect change in housing, fire protection, education, and a number of other key areas. Specifically in regard to education, a small group of women in the PNCC led efforts to establish a high school in the Pilsen community. This research is primary source driven and supported by secondary texts of history, political science, and education. Most documents were accessed through the Community Archives located at University of DePaul Library. Additional materials were found from the Chicago Tribune and University of Illinois at Chicago archives. The research resulted in an outline of PNCC development of the Benito Juarez High School: making the community aware and invested in solving an issue, connecting key stakeholders in the community, and becoming a part of the solution.

87 Marta Chrzanowski
Response times in an edibility judgment as critical test of embodied cognition
Presenter(s): Marta Chrzanowski, Hannah Hyams
Department: Psychology
Faculty Mentor(s): Katja Wiemer
Session Time: Session 3

Particular areas of the brain are responsible for encoding color. In many cases, certain colors are characteristic of different items and objects. Previous research has indicated that color similarity can prime semantic memory retrieval (Yee, Ahmed, & Thompson-Schill, 2012), but that color knowledge is not necessarily impingent on linguistic categorization (Harnad, 1987). Our study seeks to find whether color desensitization decreases the efficiency of semantic memory retrieval. Specifically, the experiment presented here utilizes characteristic colors of objects to determine if color perception is necessary for identifying the use of said object. Data from about 80 participants will be analyzed using a mixed 3 x 3 ANOVA to test the effect of matched vs. mismatched color adaptation on item response time. The results will help test the prediction based on the embodied cognition view that it is necessary to simulate item color to perform a semantic task.
In this project, we will be exploring how caregivers across different ethnicities manage their adolescents’ peer relationships. The goal is to add to the existing research on this subject, as there is not a significant amount that has been done on this issue. With the development of more research, these findings can be used to better determine various psychological trends. The data set for this project has already been collected. The data will be coded and analyzed for this project. We are expecting data that yields results consistent with our hypotheses. To elaborate, we anticipate that there is a relationship between ethnicity and the reports of peer management and that this relationship is dependent on the specific ethnicity of the group in question. This research is essential to identifying parental behaviors that can impact cross-ethnic peer relationships.

Emerging adulthood is a time of life characterized by romantic relationship decision-making and increased attention towards finding a long-term partner. The vast majority of emerging adults (18 to 29 year-olds), utilize this time for romantic and sexual exploration with ambitions and expectations for marriage. Scholars have argued that this pathway to marriage has become increasingly ambiguous with fewer clear markers of relationship progression and commitment. Research on relationship development has indicated that couples who develop and maintain a mutual understanding of their courtship are more likely to flourish in long-term romantic relationships.

A qualitative approach was used to explore a new phenomenon in modern romantic relationship formation called just talking, a relationship stage distinct from other relationships such as hooking-up and friends with benefits. Themes were constructed from eight emerging adult focus groups which consisted of 43 participants from two large Midwestern universities. Utilizing constructivist grounded theory 11 unique themes were generated and the following research questions were investigated: how emerging adults conceptualize just talking (pre-dating, screening process, avoidance of commitment,), the reasons they engage in this relationship formation behavior (fear of rejection, less pressure, relationship potential, keeping options open), and how technology may facilitate the just talking process (less effort required, constant communication, image crafting, increases pool of potential partners). The results of our study have substantial implications for educators, clinicians, and other professionals who work with emerging adults.
Mia Lord

*Rat-o-nauts: The effect of space radiation on exploratory behaviors of rats*

Presenter(s): Mia Lord, Katelyn Cuthbert  
Department: Psychology  
Faculty Mentor(s): Doug Wallace  
Session Time: Session 3

Space flight stressors, such as ions from radiation in space, pose a threat to astronauts on deep space missions past the Van Allen Belt. This exposure can potentially lead to severe cognitive deficits that may affect spatial navigation as a direct response of damage to specific brain structures. The present study focused on observing the effects of a single ion from a ground-based model of space radiation on the organization of exploratory behavior in rats. Progression path circuitry, consistency of stop clustering, and change in heading during stops of exploratory behaviors were recorded to assess proper function of information processing necessary for spatial orientation under dark conditions. Data analysis is still ongoing. This experiment may help determine if the organization of exploratory behavior is sensitive to this type of space radiation. This will then establish a foundation for future studies on the efficacy of countermeasures to attenuate the effect of space radiation on cognitive deficits.

Parker Meadows

*Evaluating and Redefining Thomas Aquinas' Natural Law*

Presenter(s): Parker Meadows  
Department: Political Science  
Faculty Mentor(s): Andrea Radasanu, Katherine Hoss  
Session Time: Session 4

This work consists of a reformulation of Thomas Aquinas' Natural Law, as found in his "Summa Theologica" on the basis that Aquinas contradicts himself in several key ways, rendering his reasoning about the "ends" of the Natural Law, as well as what exactly the Natural Law is, susceptible to the scrutiny herein. This work demonstrates that the Natural Law's end, or purpose, is to achieve social peace and its secondary principles are found in the Ten Commandments of the Old Testament of the Bible. In the final analysis, this work gathers relevant statistics in support of the claim that obeyance of the Ten Commandments does generally result in social peace even if there may not be a clear consensus on more contingent matters concerning what constitutes "X" as an action violating a Commandment.
School personnel use office disciplinary referral (ODR) data as a way to monitor student behavior and potential risk factors for students in schools. Past research has shown that boys receive more ODRs than do girls in middle school (Kaufman et al, 2010) and also that boys in middle school tend to be more involved in direct bullying behavior than girls (Nansel, Overpeck, Pilla, Ruan, Simmons-Morton, & Scheidt, 2001). However, very little work has examined both ODRs and bullying role behavior in the same sample to investigate potential gender differences and a potential association between ODRs and bullying role behaviors. The current study will utilize a large, diverse sample of middle school students to investigate potential gender differences in office disciplinary referrals (ODRs), and gender differences in five bully role behaviors (bullying, assisting, being victimized, defending, and outsider behavior). In addition, we will investigate potential associations between bully role behaviors and ODRs and whether there are gender differences in those associations.

This study examined whether a cognitive model of compulsive checking provides a meaningful explanation of reassurance seeking in testing. One-hundred-and-fifty-four college students completed self-report measures including measures of low memory confidence, not-just-right-experience, and reassurance seeking test behavior. These students also provided access to their academic records including their standardized test scores and information about their academic performance in high school. A mediation model was fit to the data. The association of low memory confidence with reassurance seeking test behavior was partially mediated by not-just-right-experience. The associations of low memory confidence and not-just-right-experience with standardized test scores were fully mediated by reassurance seeking test behavior. These results provide evidence that the cognitive model of compulsive checking provides a reasonable way to conceptualize reassurance seeking test behavior. The model also identifies potential targets for increasing performance on high stakes standardized tests.
Research has shown that beliefs can influence how people evaluate arguments (Clark & Wegener, 2013; Edwards & Smith, 1996). People also evaluate logically acceptable arguments higher than logically flawed arguments (Larson, Britt, & Larson, 2009). A question of interest to us is: what else can influence how people evaluate arguments? Are controversial arguments evaluated differently than non-controversial arguments?

The current study examined whether controversiality and argument quality play a role in argument evaluation. We are currently collecting data from introductory psychology students. We are using a 2 x 2 x 2 design: Controversiality (controversial vs. neutral) x Quality (acceptable vs. flawed) x Side (pro vs. con) within-participants design.

Participants will read and evaluate the quality of each argument. They will then type what they were thinking while evaluating. Lastly, we will collect data about beliefs and knowledge for the topics.

We expect that acceptable arguments will be rated higher than flawed arguments (Larson, Britt, & Larson, 2009) and that belief consistent items will be rated higher than and scrutinized more than belief inconsistent items (Edwards & Smith, 1996). We suspect that people hold more extreme beliefs about controversial arguments and they will be rated more extremely and scrutinized more than neutral items. We hope this study will teach us more about what factors influence the evaluation of arguments.
The purpose of this study is to examine the association between relative age and ADHD symptoms in kindergarten students. Relative age is the difference in age between students in the same grade, between the youngest and oldest students (Barnsley, 1985). Studies have shown that older students are more likely to have greater academic achievement and are less likely to exhibit symptoms of ADHD compared to younger students in their same grade (Holland & Sayal, 2018). It is important to understand how younger student behaviors are perceived differently when compared to older students in their grade by teachers and parents. It is also important to understand the subtypes of ADHD and how relative age effect impacts each subtype. To examine the association between relative age and ADHD symptoms, we will analyze extant data that includes relative age compared to the youngest kindergarten peer and ADHD symptoms as reported by parents and teachers in a sample of approximately 150 kindergarten students. Through analyzing the data of kindergarten students, we will also investigate relative age effects separately for parent and teacher report of ADHD symptoms. Testing this allows us to discern whether there are significant differences in how parents and teachers report student ADHD symptoms. These findings will clarify the role of age in determining ADHD as well as the role of the reporter. In addition, the two subtypes of ADHD, inattentiveness and hyperactivity/impulsivity will be examined to determine if relative age effect is stronger for one subtype than the other.

Spontaneous occurring behavior are rich tools for accessing rodent models of neurological disorders; however, they are locked behind time intensive manual digitization. Machine learning architectures have shown promise in marker-less digitization of behavior. This study analyzes the viability of machine learning in accurately tracking slips of rats on the rung walking task. In addition, it will test the machine learning ability to differentiate between control rats and rats whom have had the repeated concussion model. The result of this work will test the efficacy of machine learning in accurately tracking spontaneously occurring behavior during skilled walking. Provided that machine learning accurately tracks and dissociates performance of control and concussed rats, a foundation will be established for future studies investigating brain and behavior relationships.
Interest is related to how curious and motivated people are to learn. This study focuses on situational interest, which emerges in response to cues in the environment that attract attention and foster affective engagement (Hidi & Renninger, 2006). Prior research has shown that fictional narratives containing more surprise are more interesting to readers than comparable narratives with less surprise (Iran-Nejad, 1986). This study extends the research to include scientific expository texts to test whether surprise could increase readers’ willingness to read about science. We hypothesize that scientific texts that include a surprising element will lead to more interest in reading about the topic than texts that immediately spoil the surprise. Participants will be asked to read one of two passages about how hurricanes affect frog populations in the Caribbean. In one condition participants will be exposed to information designed to elicit a surprise by withholding the outcome information. In the other condition, this surprise is spoiled by indicating the counterintuitive outcome at the beginning. We expect that participants exposed to the surprise will be more likely to continue reading the passage after being told they could stop and will report the passage as being more interesting. This research has the potential to improve students' motivation to read scientific information.
Theodore Agbemaple

*INAV: Assessing dead reckoning based navigation with an electronic application*

**Presenter(s):** Theodore Agbemaple  
**Department:** Psychology  
**Faculty Mentor(s):** Doug Wallace  
**Session Time:** Session 1

Changes in spatial orientation have been observed during the progression of neurodegenerative disorders (Alzheimer’s Disease). Computerized tasks of spatial orientation may provide an early assessment of neuropathology. Dead reckoning is a navigational strategy that involves processing self-movement cues generated while moving through an environment to estimate the distance and direction to the point movement originated. This experiment examines whether an application on an electronic tablet can elicit performance similar to ambulatory and manipulatory dead reckoning tasks. Participants were given 12 trials to use their finger to search for a hidden goal and upon finding the goal, they were instructed to return to the start point. The complexity of the searching segment will be compared to the accuracy of finding the start location on the searching segment. Data analysis is ongoing and the results will be reported at the time of the presentation. These results will evaluate whether a dead reckoning task can be adapted to an electronic tablet. Successful translation to an electronic tablet will establish a foundation for future work investigating factors that influence spatial orientation and may provide an early assessment of neurodegenerative diseases.

Veronica LeRoy

*The Effects of Stereotyped Relevant Information on the Perceptions of Employee Potential*

**Presenter(s):** Veronica LeRoy, Jordan Kerbis, Megan Stricker  
**Department:** Psychology  
**Faculty Mentor(s):** Lisa Finkelstein  
**Session Time:** Session 2

Psychological research in the area of disabilities that are not directly observable (invisible disabilities) is relatively new and rapidly expanding. Invisible disabilities present unique challenges that have not yet been studied in depth. The process of designating an employee as high potential - meaning they are likely to earn promotions in the organization and take positions of leadership over time - has been studied by Finkelstein, Costanza, and Goodwin (2015). Research has not been done to examine whether having an invisible disability affects the degree to which an employee is evaluated as having high potential. Additionally, mental health disorders are often uniquely stigmatized as less legitimate when compared to other medical diagnoses, making them less likely to be acknowledged by employers and coworkers as warranting accommodations (Santuzzi & Waltz, 2016). If some invisible disabilities are considered more legitimate than others, then it may also be the case that distinct types of invisible disabilities have different effects on perceptions of potential. The current study will manipulate the type of invisible disability, and the degree of stereotyped relevant information presented to test the effect on judgements of potential and promotability. After receiving employee information, participants will fill out questionnaires to evaluate the employee. Finkelstein et al. (2015) present a model for the characteristics underlying potential - including personality factors, social competence, growth and learning competencies, and cognitive ability - and participants will evaluate the employee in four categories as well as their potential promotability.
Disabilities that are not directly observable (invisible disabilities) is an area of psychological research that is rapidly expanding and in need of further research. Invisible disabilities are different from the stereotypical interpretation of “disabilities” in that they are not readily apparent to others; thus, their holders have control over disclosure of their disability status. While the effects of disclosing a disability in the hiring process have been well founded (Spirito Dalgin & Bellini, 2008), there has been little research on their impact on their perceptions of workplace potential. Additionally, job relevance of a disability has been shown to influence evaluations of employees (Colella & Varma, 1999). Recently, research has theorized about the process of “designating workplace potential”, meaning they are likely to earn promotions in an organization and take positions of leadership over time (e.g., Finkelstein, Costanza, & Goodwin, 2015). Finkelstein et al. (2015) present a model for the characteristics underlying potential, including personality factors, social competence, growth and learning competencies, and cognitive ability. Previous research has looked at the effect of an invisible disability on perceptions of employee potential (Kerbis, Stricker, Atterberg, Thomas, & Finkelstein, 2018), but job relevance was not tested. The current study manipulated the presence of a job-relevant invisible disability and the quality of employee performance to test the effect on perceptions of potential. After receiving employee information, participants filled out questionnaires to evaluate the employee on the four categories of potential as well as their promotability.

101 Marta Chrzanowski

The impact of stigma management strategies on coworker attitudes
Presenter(s): Marta Chrzanowski, Neysra Rivera, Krista Ekburg
Department: Psychology
Faculty Mentor(s): Lisa Finkelstein
Session Time: Session 4

A stigma can be defined as a condition that deviates from the norm and elicits labeling, stereotyping, separation, and discrimination (Williams & Polaha, 2014). Almost anything can be stigmatized, by the way an individual chooses to eat, dress, or live. Some stigmatized conditions are immediately visible, such as having a noticeable physical disabled. However, many stigmatized conditions are not immediately visible unless disclosed by the individual (e.g., a mental illness). These are referred to as invisible stigmas (Lynch & Rodell, 2018). For those with an invisible stigma, hiding this can largely affect well-being in the workplace in a particularly negative way. Many individuals choose to hide their stigma for an understandable fear of being discriminated against or others' negative reactions. Many only disclose if they feel it benefits their situation (Toth & Dewa, 2014). Consequently, worker performance may suffer from this decision, as it is proposed that using mental resources to hide a stigmatized identity can hinder the ability to work optimally with all resources focused on the task at hand (Lynch & Rodell, 2018). This study aims to add to this growing body of literature on stigma management by using an experimental vignette design. Specifically, we aim to expand upon the work of Lynch and Rodell (2018) who proposed there are four types of stigma management strategies: assimilating, decategorizing, integrating, and confirming. We seek to examine the causal influence of each strategy on coworker attitudes, and subsequent behaviors (e.g., ostracism and support).
102 Lauren Clohessy
The Future of the #MeToo Movement
Presenter(s): Lauren Clohessy
Department: Sociology
Faculty Mentor(s): Janet Reynolds
Session Time: Session 1

The current era of the Me Too movement started in 2016 when Alyssa Milano tweeted out a concept: for her Twitter followers to tweet using #MeToo if they were victims of sexual misconduct. The actual Me Too movement started over ten years ago with Tarana Burke, who founded the movement to advocate for young, black women who were victims of sexual misconduct. The two movements merged into one and is now the social media movement society knows today. With Me Too came a large amount of backlash, similar to any other social media movement, but the amount of backlash depends on the amount of controversy regarding the issue. I argue the future of the Me Too movement is being challenged in an effort to maintain the status quo, as any social movement experiences, however the attackers have framed the movement as a gender war when, in fact, my research shows that the attacks are coming from both men and women. Through qualitative data collection, I found three themes that represent disputes against the movement: the attacks against women, the outcome the movement has for men and discounting the movement as a political tool.

103 Megan Lipton
Wandering in the dark: Evaluating the effects of cholinergic deafferentation in the septohippocampal system
Presenter(s): Megan Lipton, Viviana Castillo
Department: Psychology
Faculty Mentor(s): Douglas Wallace
Session Time: Session 2

Alzheimer’s disease (AD) is a neurodegenerative disorder that leads to deficits in navigation such as wandering behaviors. Wandering is observed in six out of ten AD patients. Wandering behaviors may be attributed to deafferentation of the cholinergic septohippocampal system in the brain. This system helps support the ability to process self-movement cues while navigating. To evaluate the role of medial septum cholinergic neurons in providing self-movement cues to maintain spatial orientation, lesions were produced with the immunotoxin 192 IgG-saporin. Rats were then allowed to explore an open environment in the dark, thereby limiting rats to only using self-movement cues. Behavioral performance was characterized by progressions in path circuitry, stop clusters, and changes in heading. The results of this study aim to provide a better understanding of the role of medial septum cholinergic neurons in providing self-movement cues for maintaining spatial orientation. This study may provide insight into the neural systems contributing to AD wandering behavior.
Audrianna Richard

Determining the likelihood of disclosure of one's disability when changes in the phrasing of workplace policies are made by completing a content analysis and online experimental design.

Presenter(s): Audrianna Richard

Department: Psychology

Faculty Mentor(s): Alecia Santuzzi

Session Time: Session 4

Disclosure of one's hidden disability at the workplace is necessary for appropriate accommodations from the employer. However, disclosure also puts employees at high risk of negative social consequences. Previous research finds low rates of disclosure in the workplace due to the attached stigmas and discrimination, which can indirectly impair the health of the employee. This project is focused on the language strategies used by employees with disabilities to introduce their disabilities in the workplace.

We suspect that employees carefully select terminology to describe disability in order to qualify for accommodations while at the same time avoiding the social stigma of a "disability" label. We believe this also has implications for disability disclosure rates when employees are asked to report a disability. By conducting a content analysis of interviews completed by individuals with disabilities, conclusions drawn from the content analysis will help to create modifications to disability disclosure forms that might encourage more disclosures among employees with disabilities. Conclusions drawn from the content analysis will help to create modifications to disability disclosure forms that might encourage more disclosures among employees with disabilities. This project will provide new information pertaining to the likelihood of the disclosure of one's disability when changes in the phrasing of workplace policies are made.
Kiara Brown
*How Do Task Instructions Affect Memory for Topics in Science?*
Presenter(s): Kiara Brown, Kathryn Rupp
Department: Psychology
Faculty Mentor(s): Anne Britt
Session Time: Session 3

Prior research shows that students struggle to understand scientific explanations (Griffin, Wiley, Britt, & Salas, 2012; Hastings, Hughes, Blaum, Wallace, & Britt, 2016). This may be because they are not using the right reading strategies to form coherent mental models of the explanations. More robust task instructions may aid students in understanding scientific topics because differing task instructions has been shown to affect representations of a text (Wiley & Voss, 1999). Therefore, we used a 2 schema instruction (given, not given) — 2 strategy instructions (given, not given) between-subjects factorial design. Participants receiving schema instructions were told that their explanations should include an initiating cause that leads through a series of intervening steps and results in a to-be-explained outcome. Participants receiving strategy instructions were given hints on how to identify important information for the explanation (e.g., order, causality). One hundred and twenty-one introductory psychology students were randomly assigned to one of four task instruction sets before reading eight short scientific explanations (e.g., the process of wastewater treatment; glass recycling). First, participants rated their prior knowledge on the set of eight science topics. Following reading the topics, participants completed a recall task for each passage. We expect that participants receiving the more robust instruction-set would recall more of the text as compared to the control condition because they will have more guidance on what to include in an explanation and how to find that in the text. Data coding and analyses are still ongoing.

Holly Sampson
*Can Reading Scenarios Affect Learning from a Textbook?*
Presenter(s): Holly Sampson, Kaya Easley
Department: Psychology
Faculty Mentor(s): Anne Britt
Session Time: Session 1

Imagine how you would read differently if asked to read a textbook excerpt for an exam versus reading to tell your curious friend about the content. Prior studies have found that instructions such as these can influence how people read and what people learn from texts (van den Broek, Lorch, Linderholm, & Gustafson, 2001). A recent theory suggests this could be due to what people represent about the situation (context model) and the actions that they would take and why they would take those actions (task model) (Britt, Rouet, & Durik, 2018). The present study investigated how those in an exam scenario might form different mental models than those reading to tell a friend. Fifty-nine introductory psychology students were randomly assigned to read a textbook excerpt about persistence either for exam or for a friend. After reading, learning was measured by first recalling important information from the text and then completing a multiple-choice test. Then they wrote down what strategies they used (task model assessment) and what the instructions were (context model assessment). Finally they were asked how immersed they were in the scenario. We expect that those reading for an exam would learn more about the definitions, explanations, and evidence than those reading for a friend but the reverse is expected for the seductive details. We also expect the task model and context model assessment will explain these differences. We have collected all the data and are currently analyzing it.
Do differing God concepts have differing effects on state anxiety?

Presenter(s): Jordan Kerbis, Dylan Pencakowski, Ashlyn Thurman, Vincenzo G. Pozzie, Megan Boehning,
Department: Psychology
Faculty Mentor(s): Kevin D. Wu
Session Time: Session 4

Obsessive-compulsive disorder involves persistent, recurrent thoughts that provoke anxiety (obsessions) and rigid, repetitive compensatory behaviors that temporarily reduce anxiety (compulsions). Research has shown that exposure to God concepts are related to increased anxiety, regardless of religious affiliation (Tourben & Meier, 2010). Additionally, religiosity is empirically correlated with scrupulosity, obsessions and compulsions with a religious or moral theme (Shams & Milosevic, 2013; Witzig & Pollard, 2013).

Our study examined whether participants primed with a punishing God concept would experience greater increases in anxiety following a distressing behavioral task than would participants primed with a forgiving God concept.

Participants (N = 75) completed questionnaires and were randomly assigned to read/write about one of two Bible passages (Punishing or Forgiving) and then complete Rachman et al. (1996) Sentence Task. This involves writing the anxiety-provoking sentence I hope [loved one] is in a car accident. State anxiety was assessed before and after the Sentence Task. Scrupulosity and religiosity were significantly correlated (r = .29, p = .012). However, no significant group differences were found on pre or post anxiety scores. A mixed ANOVA was performed, with group as the between-subjects variable, time as the within-subjects variable, and state anxiety as the dependent variable. There was a significant main effect for Time (F(1, 73) = 91.93, p < .001), but not for Group (F(1, 73) = .27, p = .61). The Time x Group interaction also was not significant (F(1, 73) = .004, p = .95). Study limitations and future research directions will be discussed.
108  Travis Paquin  
Usage, Obtainment & Selling Practices of Known Substances on University Campuses  
Presenter(s): Travis Paquin  
Department: Sociology  
Faculty Mentor(s): Fred Markowitz  
Session Time: Session 3  

Drugs, such as marijuana, cocaine and Adderall (Ritalin, Vyvanse, ProCentra or any other amphetamine/stimulant) have been news-worthy because of their prevalence among college students. While the topic of drug use has been long-studied, research has not fully examined who is most likely to use, sell and/or obtain a certain substance on university campuses. This research examines differences between race, socioeconomic status and gender in drug usage, obtaining drugs, and selling practices. The study will also examine the relationship between usage, obtainment, selling practices and alcohol consumption patterns. The data used come from students from a mid-western university who were surveyed using convenience samples of social science majors and minors along with students in general education social science classes. The results show moderate proportion of students use of marijuana and alcohol. Also, there are statistically significant differences by cocaine use and stimulant use in sex and race. Finally, there are moderately strong correlation between marijuana use and cocaine use.

109  Natalie Adamczyk  
Castration and Concussion: Effects on Skilled Walking  
Presenter(s): Natalie Adamczyk, Ryan Johnson  
Department: Psychology  
Faculty Mentor(s): Douglas Wallace  
Session Time: Session 2  

Repeated concussion, a form of traumatic brain injury (TBI), among humans is shown to cause dizziness and lack of coordination. TBI can damage the hypothalamic-pituitary-gonadal (HPG) axis causing a decrease in testosterone output, inhibiting neural plasticity. The current study examined motor function after a repeated TBI procedure alone or in combination with castration. Skilled walking was evaluated on days one, three, and seven post-operatively using the rung walking task. Trials in which the rat completely crossed the apparatus without experimenter interference were scored for slight slips and deep slips. Data analysis of the study is currently in progress. These results will evaluate the role of testosterone in influencing motor deficits associated with rodent model of repeated concussion. This work may establish a foundation for future studies investigating novel therapeutic interventions for repeat TBI.

110  Dulce Hernandez  
Protest and Immigration Rights Organizations  
Presenter(s): Dulce Hernandez  
Department: Sociology  
Faculty Mentor(s): Simon Weffer  
Session Time: Session 1  

This project looks at immigrant rights organizations and how it is that they work together or alone to mobilize and protest. We want to see if there are any missing parts to their networks.
Rachel Pollock

The Association Between Coping Styles of Child Abuse Victims and their Posttraumatic Stress Trajectories after a Mass Shooting

Presenter(s): Rachel Pollock
Department: Psychology
Faculty Mentor(s): Holly Orcutt
Session Time: Session 4

Research indicates that exposure to multiple traumatic experiences often correlates with increased posttraumatic stress symptoms (Suliman, Mkbile, Fincham, Ahmed, Stein, & Seedat, 2009). Notably, reactions to trauma are also very diverse and symptoms change over time. With the inclusion of pretrauma data, four distinct posttraumatic adjustment trajectories were identified in mass shooting victims including chronic dysfunction, moderate impact-moderate symptoms, high impact-recovery, and minimal impact-resilience classes (Orcutt, Bonanno, Hannan, & Miron, 2014). Additionally, the literature suggests that personal factors such as poor coping and emotional regulation strategies often contribute to long lasting posttraumatic stress, especially for victims of child abuse (Leitenberg, Gibson, & Novy, 2004). Overall, there is a lack of literature utilizing pretrauma data to analyze trajectory placement with factors leading to posttraumatic adjustment. Therefore, I hypothesize that women who have experienced child abuse and a mass shooting presenting poor coping strategies will have a stronger association with placement into the chronic dysfunction and moderate impact-moderate symptoms trajectories. Additionally, I hypothesize that, for the same population, positive coping strategies will have a stronger association with high impact-recovery and minimal impact resilience trajectories. This sample consisted of all female participants that experienced child abuse and were present during the Northern Illinois University mass shooting. They were asked to complete the following measures: Traumatic Life Events Questionnaire (Kubany et al., 2000), Childhood History Questionnaire (Milner, Robertson, & Rodgers, 1990), Family Experiences Questionnaire (Briere & Runtz, 1990), Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004), and the Distressing Events Questionnaire (Kubany, Leisen, Kaplan, & Kelly, 2000). Clinical implications will be discussed.
For decades, governments have used tax incentives to lure companies to locate within their jurisdictions or to remain in their jurisdictions. These incentives can be controversial, but they can also enhance the reputations of the politicians that orchestrate them. In this study, we will examine the incentives given to Mitsubishi by the State of Illinois, McLean County, and the Town of Normal to locate and keep its factory in Normal, Illinois. Our research will consider the lifetime of the Mitsubishi plant, from the time it opened to the time it closed. The primary goal of this research is to inform governments and their constituents regarding the effectiveness of these kinds of incentives. We will evaluate the incentives’ effectiveness using the export base theory which looks at the jobs created and the amount of money contributed to the community through salaries, taxes, and other expenditures. We will also take into consideration the economy of McLean County and the changes in tax law over this time period. We anticipate the tax incentives were ultimately money for nothing, since Mitsubishi eventually shuttered its operations and left the community. If this is our ultimate conclusion, we hope to determine what went wrong and how better results might be achieved in the future.

Abby Roemer
Sense Making During an Experiential Learning Project
Presenter(s): Abby Roemer, Nicole Walczak, Kalie Tazbier, Kelli Tyler, Yousef Judeh, Jessica Pendleton
Department: Management
Faculty Mentor(s): Mahesh Subramony

Experiential learning refers to the process of converting real-world experience into learning through the process of reflection and theorizing. A team of 7 human resource management (HRM) students were involved in two research-based experiential learning projects, focused on the development of professional competencies, when all sense of normalcy was shattered through a mass shooting in Aurora, IL that claimed the life of one the students – Trevor Wehner. In coping with their deep loss, the student team re-prioritized efforts, set new goals that included completing project-based commitments while establishing a program to continue the legacy of the team-mate. This poster will describe team-members’ reflections and learnings from the tragic event and its aftermath utilizing a model of sense making (Weick, 1993). Although this poster follows a unique path in its focus on the learning process itself, as opposed to results from a study, it provides an example of the technique of auto-ethnography utilized within an unplanned and tragic context.
Retrain or Relocate? The Unintended Effect of Mandatory Partner Rotation on Audit Quality in the U.S.

Presenter(s): Adam Rivas
Department: Accountancy
Faculty Mentor(s): Ally Zimmerman
Session Time: Session 4

Daugherty et al. (2012) surveyed and interviewed audit partners and found that when they had to choose either to relocate to maintain their industry expertise or to retrain and gain new industry clients, partners are more likely to opt to retrain rather than relocate. These partners knew that the choice to retrain was likely to have a negative effect on their audit quality, but they chose so to preserve their quality of life (Daugherty et al. 2012). This paper contributes to the research on audit partner rotation/retention by examining whether the changing of industries by audit partners negatively affects audit quality. I developed a unique measure of whether partners changed industries by analyzing a sample of audit partners included in both past SEC Comment Letters and AP Form databases. The results of my own analysis showed that audit partners do prefer to retrain rather than to relocate. Through the data, I was able to find that partners who change industry of expertise as compared to non-industry change partners are associated with higher abnormal accruals; an indication of higher client earnings management and lower audit quality. In summary, my data supports the survey data from Daugherty et al. (2012) showing that partners who change industries of expertise provide lower quality audits.
Maria Almeida  
*The Phantom Tollbooth Philosophical Index*
Presenter(s): Maria Almeida  
Department: Leadership, Educational Psychology and Foundations  
Faculty Mentor(s): Leslie Sassone  
Session Time: Session 2

The Phantom Tollbooth by Norton Juster is a children's book about a boy on an adventure learning new things about the world. Looking deeper into the book there are many philosophical aspects to the text. With research it was discovered that there were limited guidelines, suggestions, or indexes to assist educators in teaching students the philosophical aspects of the text. I did a content analysis of the text and created an index.

Jessica Ankrom  
*Study Habits of Teacher Candidates*  
Presenter(s): Jessica Ankrom, Angie Lobdell  
Department: Special and Early Education  
Faculty Mentor(s): Gregory Conderman  
Session Time: Session 1

This study was designed to examine different study habits of elementary education, special education, early childhood, and secondary pre-service education majors at Northern Illinois University (NIU). Eighty-nine pre-service majors completed surveys during their junior or senior education courses. Researchers were interested in knowing what study habits were most used and which habits had the most impact on students' academic success. Results indicated that NIU pre-service educators tend to study between 11 and 15 hours a week, prefer handwriting notes during lectures, prefer taking notes while reading the textbook and find support from the Writing Center somewhat helpful. Their most frequently used study skills were breaking down large projects and studying with a peer. Results provide implications for NIU administrators, professors, and advisors.
This study presents the outcomes of a middle grades teacher candidate’s participation in the Clinical Urban Plunge (CUP) project. The CUP project is grounded in the overarching belief that learning how to meet the diverse needs of adolescent students requires engagement in authentic experiences within diverse learning environments, where clinical practice and partnership are central to high-quality teacher preparation. CUP specifically provides an opportunity for personal growth and reflection in social justice and equity education through a unique experience observing and participating in various community and educational experiences, including home visits with families in the school-university partnership community. The teacher candidate participated in professional development activities and spent three days in field observation, visiting the homes of two families and the students’ schools. Data were obtained through the use of semi-structured interviews with school personnel, family members, community crisis center staff, and liaisons of U-46’s Homeless Education Program: Project Access. Data also included observations in school and home settings and official educational documents. The CUP project allowed the participant to better understand children and their families from economic, social, and cultural perspectives. Awareness of these outcomes may guide development of innovative educator preparation practice, and thus better prepare middle grades teacher candidates to meet the diverse needs of adolescent learners.
Writing is essential in the success a student has not only in the classroom but also outside of school in the career field, yet many students find themselves struggling to grow and attain this skill. Graphic organizers have been proven to help students with this skill. A graphic organizer is versatile in the sense that it can be used across different subjects and at any grade level when implemented correctly. The goal of the following intervention was to help the target student meet her designated IEP goal, to write a total of five sentences. In this paper the intervention and research behind it is explained thoroughly in order to determine the success the given student has portrayed in comparison to her writing before the intervention.

On task behavior is defined as looking at and working with the materials provided in the correct manner necessary in order to complete the assigned classroom task. Research has shown that implementing physical activity and “brain breaks” in the classroom assists in minimizing off task or undesirable behavior. Short breaks that include physical activity can be simply implemented in the classroom, for the whole class, a small group, or an individual student. Focusing on one individual student a brain break was implemented and the results showed that with the brain break on task behavior increased. A brain break was implemented for a fourth-grade student to evaluate the impact it would have on his on task behavior. Data was kept on the student’s on task behavior to aid in the evaluation of the effectiveness of the brain break. The results showed to have a positive impact on the student’s on task behavior.
121  Evadne Bowlin  
Supporting students who have both: ELL and IEP support needs  
Presenter(s): Evadne Bowlin  
Department: Special and Early Education  
Faculty Mentor(s): Natalie Andzik  
Session Time: Session 2  

There are four top strategies to teach students who are English Language Learners (ELLs) who have an Individualized Education Plan (IEP). Each strategy is researched based to ensure the child’s success in learning both as an ELL and with an IEP required disability. The use of multiple texts and journals were used to select the top four strategies and assess their effectiveness to reach this specific type of student. These four strategies are co-teaching, using visuals, implement writing strategies, and focus on literacy development. Co-teaching is important to ensuring differentiated education for each student, integrating visuals is necessary to better support all learners, writing strategies are essential for eliminating any concern with the strenuous task of writing, and the development of literacy is vital to becoming a member of society. Readers will take away the importance of integrating each strategy into their classroom to better support students who are ELLs with an IEP.

122  Angie Lobdell  
Measuring the Impact of Writing Interventions on Students’ Writing Outputs and Anxiety Levels Through the Use of Biomarker Technology  
Presenter(s): Angie Lobdell  
Department: Special and Early Education  
Faculty Mentor(s): Toni Van Laarhoven, Lisa Liberty, Jesse (Woody) Johnson  
Session Time: Session 4  

The purpose of this project was to determine the effects writing has on stress levels of students with anxiety-related disorders and to investigate the effectiveness of technology-based writing interventions to reduce anxiety and increase writing output when being utilized by students. One male and three females between the ages of 14-17 participated in the research. Each participant wore a biomarker device that allowed the researchers to track the participants’ levels of anxiety. The levels transmitted by the biomarker indicated a state of calm, focused, tense and neutral. Baseline involved observing students writing without technology supports. Upon completion of a baseline period, two writing interventions (i.e., Chromebook or Read & Write) were implemented into the educational procedures on an alternating schedule. The effectiveness of the interventions was tracked by collecting data regarding the students' anxiety levels as evidenced by the biomarker technology and direct observation, as well as by comparison of writing samples collected during the baseline period of the research with the samples collected during intervention phases. Although results were not significant, the interventions did result in limited success for some of the participants. Data collected implies that further research would be beneficial to this study.
The changing needs of our students, such as an increased knowledge of social justice and equity issues, are gaining importance in teacher training programs as world views of social norms are broadened to address the changing demographics in schools. The purpose of this study was to determine if there were levels of support for cultural relevance in state recommended lessons. The lesson focus was on resources from a southern region identified as resistive to political, cultural and ethical relevancy. A qualitative summative content analysis was used to determine themes. Based on the research from The Center of Research on Education, Diversity and Excellence (CREDE), eight constructs were identified using a four-point scale ranging from not observed to highly effective. Level of agreement was determined among three coders with a seventy-five percent agreement to determine reliability. Results from the study indicate Access to grade-level content and challenge were clearly evident in the identified plans. However, there was little evidence of equity and social justice in the plans. The other 4 constructs, voice, differentiation, language and literacy and connections had moderate evidence to support implications within the lesson plans. Future implications include use of social justice and equity standards, teacher training in adapting state-recommended resources to include these standards and changing policy for resource development by states to include social justice and equity standards within lessons.

Reading achievement in school is a strong predictor for academic success. Despite being a vital skill for development, many students today are reading below grade level. Direct instruction is one practice that is supported by research and assists students with improving their reading performance. Direct Instruction is a teaching method that teachers use to explicitly teach important skills, such as reading fluency and comprehension. This article explains the value of direct instruction and how it can be implemented in a one-on-one setting. Direct instruction may help with improving reading fluency, understanding main idea and details, and developing comprehension.
125 Andrea Guzman  
The Effect of Using Flashcards and Math Racetrack to Improve Multiplication Fluency  
Presenter(s): Andrea Guzman  
Department: Special and Early Education  
Faculty Mentor(s): Natalie Andzik  
Session Time: Session 4  

Phoebe is a nine-year-old student in a fourth-grade general education classroom. She is included in most academic activities except when she is pulled out of the classroom for Response to Intervention (RTI) for reading support and speech services. She does not receive any support for mathematics. Phoebe has demonstrated understanding in most grade-level math concepts and procedures (e.g., addition, subtraction, rounding). However, she struggles with fluency (i.e., speed of retrieval of basic math facts). Both her teacher and mother disclosed that they have concerns for Phoebe’s fluency, in particular, multiplication. After obtaining Phoebe’s mother’s approval we began conducting the study to see if her fluency in multiplication improves with the use of flashcards and math racetrack. Her improvement was measured through the use of a five-minute multiplication timed test. The study showed Phoebe’s improvement in her multiplication fluency, and a newfound confidence.

126 Katelyn Gaul  
Understanding Self-Determination Skills in Early Childhood: Parent and Educator Strategies for Promoting SD Skills in Young Children  
Presenter(s): Katelyn Gaul  
Department: Special and Early Education  
Faculty Mentor(s): Stephanie DeSpain  
Session Time: Session 2  

Self-Determination is a process by which a person can control their own life and decisions through the guidance of important adults in a child’s life and time devoted to learning the skill. Important adults should come together to provide effective cues and environmental accommodations to promote development for children with disabilities. Development of self-determination skills provides the assurance that children with special needs will be able to live their future more independently and less reliant on others to live a natural life. Instruction on self-determination is typically embedded in life-skills programming for children with disabilities; however, programming must start in early childhood in order to promote optimal results. Further, parents and educators must work together to facilitate development. Therefore, this presentation provides an overview of the current literature available on the importance of parent involvement in facilitating the development of self-determination skills in young children with disabilities. Further, this presentation provides an overview of when these skills should be implemented and how to best promote development. Participants will learn about multiple techniques and models that can be implemented to promote the development of self-determination and highlight the benefits of collaboration on this topic between important adults (e.g., parents, teachers) in the lives of children with disabilities. The overall results from review of literature highlight that the earlier the self-determination instruction is implemented, the better the outcome will be for the child and their future.
127  Christine Rueger

Bent Art Exhibit
Presenter(s): Christine Rueger
Department: Art and Design
Faculty Mentor(s): John Siblik, Johnathan Strube
Session Time: Session 2

This project involves collaboration between two schools within the College of Visual and Performing Arts: the School of Art and Design, and the School of Theater and Dance. Plans include collecting and displaying work in conjunction with the theater production of Bent. The art work included in this exhibit will address the following themes: human dignity, gender identity, sexuality, and tolerance. The Bent Art Exhibit, and the Bent theater production will be held May 2nd through May 4th, in the Corner and Sally theaters of the Stevens Building.

128  Luke Pisha

Save Mother Earth: Video Game Concept
Presenter(s): Luke Pisha, Maria Jonas, Haileigh Grant
Department: Art and Design
Faculty Mentor(s): John Siblik
Session Time: Session 3

This project involves collaboration with a community partner, Littlejohn Elementary School. Each year Littlejohn Elementary School, DeKalb holds a Fine Arts week centered around a theme. The theme for this year’s Fine Arts week will be Earth Day. The project we decided to do is a concept for a turn-based role-playing game. In the game, the player and two party members will use animals to save different habitats from destruction. Such habitats include the tundra, the desert, the forest, the ocean, etc. Also, enemies are based on different types of pollution and corruption these habitats face. Each time a certain habitat is saved, the player obtains new animals to utilize in battle. The point of the game is to save all the habitats, thus, saving the planet. Our group chose the format of a game because it will help people interact with something rather than look at a piece of art on the wall. The interaction may inspire the players to enact some type of change to help and protect the habitats of animals. Plus, it will be a very simple process to download and play the game. (Note: This game is still in development)
Medical illustrations in textbooks have evolved throughout the history of science. This has led to questions about which technique provides the most effective model for students to learn. The purpose of this research is to provide a clearer understanding of how different types of medical illustrations affect the way college students learn and understand information provided in drawings. Three medical illustrations representing three different historical methods in which medical processes have been illustrated will be created. In addition, a survey will be created to collect information about people’s comprehension of the illustrations. The survey and illustrations will be presented online to science and art majors using the Qualtrics survey program. It is anticipated that the most simplistic and minimalistic drawing will be perceived as the easiest to understand. These results may have an impact on how illustrations are presented in textbooks in the future.
Music Education encapsulates a variety of benefits for every single child. “Research has demonstrated that musical learning and experiences enhance the study of other subjects, and boosts skills that children inevitably utilize in other areas (Brown, 2013)”.

There is a vast variety of differences between the standards amongst different countries. This research poster will investigate similarities and differences amongst K-12 music education standards throughout Poland and the United States, and identify components of content amongst music pedagogies throughout both countries.

For example, Poland has professional primary music schools, secondary music schools, and music high schools. These types of Polish schools differ from general professional education schools or academies where music is only taught once per week (Zwolinska, 2007). These schools offer music training which includes music theory, and students are required to perform an audition pending acceptance into the school or academy.

In contrast, in the United States, music education is commonly taught in most public schools from K-12. The late-2015 reauthorization of federal K-12 legislation, now known as Every Student Succeeds Act (or ESSA), orients K-12 schooling around the notion of a “well-rounded education” comprising eighteen distinct subject areas of music and the arts.

This research will also highlight how the American and Polish Music Education standards interconnect or differ, along with how music is being taught in these two countries. Curriculum design and observations amongst interpersonal relationships with students, faculty, and communities-at-large will also be discussed.
Food security, as defined by the United Nations Committee on World Food Security, means the physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs at all times. Having access to nutritious foods at affordable prices is important because fresh fruits and vegetables are becoming harder to obtain for both individuals below the poverty line as well as those above it. This decline in production has affected households all over the world. In America alone, 1 in 8 million people are considered food insecure due to lacking the proper nutritional values in their diets. We titled our piece “Food Perspective” because one way to determine if someone is food insecure is by inspecting their pantry. We wanted to stress how food security exists as a spectrum, so for our piece we made one side consists of healthy nutritious food, which contains vegetables and fruits. This is an example of a household with an expectable amount of food security. While on the other side the pantry consists of malnourished foods and is not fully stocked. This means that this household may be consistently looking for new means of acquiring food. This would be an example of a family that is considered food insecure. We will be using regular drawing paper with pencils and color pencils. The colored objects represent quality nutritious food while the black and white objects represent GMO/processed foods. The inspiration behind this project was to raise awareness for food insecurity. We designed our piece in this way specifically to illustrate the different perspectives that exists across the entire spectrum of food security. While food insecurity is primarily considered an economical issue, it is also important to address the quality of food. High quality nutritious foods are important in an individual’s growth therefore, we chose to incorporated vegetables and fruits into our piece to advocate for healthier eating habits.
132 Gabriel Sonntag  
Searching for Connections: Queer Youth Endeavors to Find Community, 1960-1985  
Presenter(s): Gabriel Sonntag, Ronan Kaiser  
Department: History  
Faculty Mentor(s): Amanda Littauer  
Session Time: Session 2  

This student research project is apart of Dr. Amanda Littauer’s broader research on queer youth history, and it is a continuation of previous research conducted under the mentorship of Dr. Littauer. Professional historians have written little about the historical experiences of queer youth. Our project aims to archive and interpret the lives of queer youth to understand the historical changes of queer culture while honoring their lived experiences. This project focuses on the ways in which gay and lesbian youth have searched for connections to others in the community. The sources we have used to gather our conclusions from have been oral histories and two separate letter collections. Prioritizing intersectionality has been a crucial element of our research in order to create a developed understanding of the ways in which race, class, gender, geographical location, and age affected youths’ approaches to finding community as well as the ability of youths to interact with community. The results of our research found that gay and lesbian youth sought community with both other youths as well as older gay and lesbian individuals. While there were several common themes across the sources, including networking and the exploration of sexuality, we also discovered remarkable differences among the sources, especially when it came to the two letter collections.

133 Rosa Perez  
Optimization of Microbial Attachment to LDPE Plastic by Manipulation of Media and Plastic Pretreatment  
Presenter(s): Rosa Perez, Diana Miguel, Brianna Martinez  
Department: Biological Sciences  
Faculty Mentor(s): Scott Grayburn  
Session Time: Session 1  

Plastic is a mixture of synthetic polymers derived from petroleum and may last for thousands of years, leading to ‘near-permanent contamination of the natural environment’ (Sci. Adv. 2017, 3:e1700782). Other approaches to degrading plastic are needed as plastic recycling cannot completely solve waste issues.

Polyethylene and polypropylene represent about 92% of total plastic production (Curr. Biology 2017, 27: R283). A common form of polyethylene, known as low density polyethylene (LDPE) can release methane, a potent greenhouse gas, in the presence of sunlight (PLoS ONE 2018, 13(8): e0200574). Methane from LDPE will become a greater problem as plastic accumulates in the environment.

Attachment of microbes to plastic is required before plastic can be used by microbes as a carbon source. The composition of growth medium was changed, and attachment was measured. Other experiments used different treatments of plastic before exposure to microbes. Plastic squares were boiled, microwaved, and incubated with base or acid at 45 C for eight days.

Fourier transform infrared spectroscopy (FT-IR) was used to show changes in plastic structure following abiotic pretreatment. One pretreatment resulted in more adhesion of Exiguobacterium Roc37 to plastic discs. Roc37 was also used for gene expression studies. Cells grown in optimized medium showed differential gene expression in cells associated with plastic versus cells from growth medium in the same flask.
Abstracts: Community Engagement Showcase

Please note: All abstracts are printed as submitted by project participants, and are represented in the college of the student’s project.
301  Jadakess Neal
Comfort Pets NIU
Presenter(s): Jadakess Neal
Mentor(s): John Siblik

My project comes out of a course I am taking called Creating Art for Others. My project is a short film about why Comfort Pets at NIU is such an important initiative. Comfort Pets at NIU will help Bring Awareness to the NIU community about this option in support of counseling services at NIU. My project also involves a student survey to access the demand for service pets at NIU as well as the hurdles and challenges to expand the availability of service pets at NIU. In my research on this topic, I have found that the accessibility form requires a mental health evaluation. Comfort Pets at NIU will include: research on the process for getting a service dog at NIU, and document current comfort pet use at NIU.

302  Skyler Imhoff
Huskie Alternative Breaks - Environmental work at Land Between the Lakes National Recreation Area
Presenter(s): Skyler Imhoff, Will Holmes, Emelina Johnson & Hannah Thompson
Mentor(s): Michaela Holtz
Organization: Land Between the Lakes National Recreation Area

For our Huskie Alternative Break, ten students, a site leader, and a chaperone traveled to Land Between the Lakes on the Kentucky-Tennessee border. LBL is a National Recreation Area managed by the USDA Forest Service, and exists to provide locals and tourists alike with opportunities for hiking, camping, fishing, and various other outdoor activities. Our group stayed at the Brandon Spring Group Center in LBL, which is run by the Forest Service and provided us with a kitchen where we could prepare our meals for the week. Our first day of service saw us removing trash and debris left near campgrounds by a recent flood, as well as several tires dumped near a roadway. The following day, we continued our cleanup efforts at Piney Campground, LBL’s largest, where we cleared debris from roadways in preparation for the campground’s opening. On our last two service days, we removed nearly 20,000 feet of old electrical fencing at LBL’s Elk & Bison Prairie, thus opening two large spaces for grazing and preventing animal entanglement. These service days bookended a free day where our group visited the nearby Golden Pond Planetarium and Homeplace living history farm, in addition to an evening trip to Nashville.
303  Chantel Davis  
*CVPA Interdisciplinary Student Projects IN ARTISTRY AND RESEARCH*  
Presenter(s): Chantel Davis & Haileigh Grant  
Mentor(s): John Siblik  
Organization: Littlejohn Elementary School  

This project: Earth Day, Fine Arts Celebration, involves the collaboration with a community partner, Littlejohn Elementary School with all three schools within the College of Visual and Performing Arts: School of Art and Design, School of Music, School of Theater and Dance. Each year Littlejohn Elementary School, DeKalb holds a Fine Arts week centered around a theme. This year, Fine Arts week will be centered around the theme of Earth Day. Plans include students creating art work in celebration of Earth Day, April 22, 2019 in conjunction with Fine Arts week. Curriculum plans are in development that may involve recycling, renewable energy, collaboration and the use of renewable resources. Plans also include students creating musical instruments in celebration of Earth Day, April 22, 2019 in conjunction with Fine Arts week. Curriculum plans are in development that may involve rhythm, collaboration and recycling. Plans also include a dance performance component in celebration of Earth Day, April 22, 2019 in conjunction with Fine Arts week. Northern Illinois University School of Theater and Dance is involved with the planning phase of this component.

304  Monica Lopez  
*The Effects of College Preparatory Classes for Latino Students*  
Presenter(s): Albert Castrejon, Monica Lopez, Angel Reyes & Monserrat Rosales  
Mentor(s): Susana DasNeves Araceli Lopez Zavala  
Organization: Parent University  

We are studying how a college preparatory class can impact high school students transitioning into college. Parent University is a program for first generation families to learn more about transitioning into college. Sessions are run every week in Dekalb high school. Parents come from DeKalb and sycamore school districts. We are focusing on this topic to understand the effects these courses have on the students, specifically looking at first-generation Latino high school students. We will be looking at the impact of these courses by comparing the Latino students from Northern Illinois University who have not had college preparatory classes to current Latino high school students who are taking the college preparatory class Parent University offers.
305 Ashley Grazutis  
*The Influence of NIU STEM Cafes in Making Informed Decisions*  
Presenter(s): Da’Janae Cary & Ashley Grazutis  
Mentor(s): Sara Finnigan  
Organization: NIU Center for P-20 Engagement

STEM Cafes are fun, casual gatherings where adults come together to eat, drink and chat with STEM professionals about the latest scientific research in STEM. STEM Cafes give STEM professionals a platform to share information about their areas of expertise and attendees the opportunity to learn and think critically about the latest updates in STEM. STEM Cafes are significant because they give STEM professionals the opportunity to present on scientific topics in order to inform the public on the latest information in STEM. The goal of this project was to find out whether or not the information presented at STEM Cafes influences people in making informed decisions. In order to find this out, our team attended a STEM Cafe and distributed a survey that asked about whether or not they would use the information presented in the STEM Cafe in the future. We found that the information presented in the STEM Cafes had little to no influence on people’s decisions. We discovered that the goal of the STEM Cafes is to inform people on the latest information in STEM. For the future, we can use this finding to improve the STEM Cafes so the participants can use the information presented to make informed decisions.

306 Estefani Rosas-Almanza  
*Tabs for Change: Huskies Pull Together*  
Presenter(s): Maricela Cruz, Jayveon Jones-Tinsey, Estefani Rosas-Almanza & Breanna Terrell  
Mentor(s): Jennifer Van Ewyk Renee Connelly  
Organization: Student Involvement and Leadership Development

Our project focuses on helping the Ronald McDonald House Charity of Chicago by bringing the NIU community together in collecting pop-tabs to contribute to helping provide families with a place to stay and eat while their loved ones receive the care they need.

307 Livilla Glover  
*Beginning the Journey to Science*  
Presenter(s): Ryan Edwards, Livilla Glover & Carmorroa Siggers  
Mentor(s): Sam Watt  
Organization: STEM Outreach

Our project centers around the concept of providing science, technology, engineering and mathematics, otherwise known as STEM, to the community. We did this by, creating a science event at the DeKalb Public Library for children ages 7-12. STEM is becoming more prominent in society, and we want to ensure that the kids in the DeKalb/Sycamore area get a chance to encounter this field. In our event, we have the kids focusing on physics and chemistry by having them make paper airplanes, erupting apples and magnetic slime. This is a fun way for them to learn about aerodynamics, kinetic energy, chemical reactions and the interactions between metal and magnets. As children, many of us did not have the chance to do such exciting experiments; therefore, we wish to change the narrative by spreading our knowledge in the STEM field throughout the community.
Our team facilitated Conversation Cafes which were a series of three workshops focusing on topics of: food insecurity, social media and mindfulness by applying sangha. We contributed to this project with the help from The Office of Academic Diversity, Equity, and Inclusion (ADEI) and the guidance of Jocelyn Santana and Erin Wilhelm. ADEI’s mission is to create an accepting environment that actively works on limiting negative stereotypes and biases as well as strives to engage the entire campus community in learning about the cultural differences that shape our world. Our project is important because we touch on important issues concerning diversity, cultural inclusivity and acceptance. Our workshops impact NIU students and Faculty, as well as anyone in the community who attends our events. Our research presents accurate and engaging workshops on the issues of food insecurity among our campus community, how social media perpetuates negative stereotypes and how sangha can help address marginalized oppression.

This project was inspired by the rising trend of mental health issues on college campuses. As college students, it is at our desire to be at our healthiest possible state of mind to avoid any distractions, so that we can stay focus on school work, jobs, and extracurricular activities. Our site, Hungry Huskies, provides free dinners every Sunday night at the Holmes Student Center. Many students come together to share meals with one another. We used our population of students to create surveys to assess general mental health wellness, and feedback on Hungry Huskies. We wanted to see if eating at Hungry Huskies provided a positive outcome to a student mental health wellness. Our survey results were collected to concluded a correlational between shared meals and mental health wellness. We would like to continue collecting data from new students, and pool significant amount of data results. With this data, we would aspire to advocate for funding to have Hungry Huskies to be held more frequently throughout the week at NIU. This allows for more opportunity to bring students together and distress over a hot homecooked meal.
310  Rebecca Berndt  
*A lesson for Earth Day, Fine Arts Celebration At Little John Elementary*  
Presenter(s): Caitlin Alejandre, Rebecca Berndt & Fae Johnson  
Mentor(s): John Siblik  
Organization: Little John Elementary School  

A lesson for Earth Day, Fine Arts Celebration, involves the collaboration with a community partner, Littlejohn Elementary School. For our group project for IVPA 201, Creating Art for others, our group aligned our volunteer interests in: Art Events, Arts Festivals, School Events and Community Art Events to the need for creating art lessons in celebration of Earth Day, April 22, 2019. Our curriculum plans include outcomes to bring awareness to: recycling, renewable energy, collaboration and the use of renewable resources. Our project will be creating earth day lanterns with the students as well as generating promotional materials for the event. Our Community Engagement Showcase poster will detail our lesson plan and promotional materials for Earth Day, Fine Arts Celebration.

311  Jessica Chamberlin  
*Promoting Volunteer Opportunities at Tails Humane Society*  
Presenter(s): Sara Beatty, Jessica Chamberlin & Lydia Filiaggi  
Mentor(s): John Siblik  
Organization: Tails Humane Society  

Our project is intended to promote volunteer opportunities for Tails. Our key concepts include: Community Engagement, Service Learning, Mental Health awareness, collaboration, creating art for others. Our goal for this project is to gain more volunteers for the Tail Program. As we learned through our classes participation in the NIU exhibit: ‘Challenging the Stigma’, promoting health and wellness at NIU and the many needs related to mental health awareness on our campus is an concern we became more aware of and therefore committed of efforts to. For our group project in IVPA 201, Creating Art for others, we decided to work with Tails because it aligned with our groups volunteer interests and our commitment to mental health issues on campus. After meeting the Tails Marketing Director, we set out to design a series of three posters to highlight the volunteer opportunities at Tails. We will present the process and materials in the poster for the Community engagement showcase.
Music and Memory: NIU Students open doors to the past for individuals with dementia

Presenter(s): Benjamin Kittle, Annabelle LaFond, Megan Nordstrom, Luz Rico & Joey Stoyas

Mentor(s): Jamie Mayer

Organization: Pine Acres Rehabilitation and Living Center

The statistics for dementia are well known: it is widespread, incurable, and increasing dramatically. Because there is no way to stop or reverse the dementia process, the best way to help individuals with dementia is to maximize engagement and quality of life using non-pharmacological approaches. One such approach is the use of personalized, meaningful music. Music has a way of bypassing cognitive and linguistic deficits in dementia due to its ability to activate deep, emotional brain centers, which tend to be preserved even in the context of the widespread brain damage associated with advanced dementia.

In the U.S., Music and Memory (M&M), was formed in 2010 to provide training and support for using digitalized, personalized music in residential dementia care facilities.

The NIU Music & Memory Student Association was formed in 2017 to help area nursing facilities initiate and run the M&M program. We combine the expertise and resources available at NIU with community needs in a functional, service-learning context for NIU student volunteers. Student volunteers currently work in Pine Acres Rehabilitation & Nursing facility; our program is planning to expand to several additional area facilities over the next two years. Students in M&M receive dementia training, then assist with assessment for and development of personalized playlists for residents enrolled in the program; they also administer music to residents and track outcomes related to communication, engagement, and mood. Our poster will explain how Music & Memory fits with current approaches to dementia care.
Abstracts: Exhibits

Please note: All abstracts are printed as submitted by project participants, and are represented in the college of the student’s project
Research on college student engagement suggests that when students participate in educationally purposeful activities, more broadly known as high impact practices (Kuh, 2008), or when students participate in extracurricular activities like joining a student organization or participating in campus activities they are more likely to be satisfied with their college experience and have positive academic achievement and success outcomes (Astin, 1977, 1993b; Bergen-Cico and Viscomi, 2013). This holds particularly true for underrepresented students (Finley and McNair, 2013). The term engagement has historically been defined in multiple ways and can mean anything from basic involvement in activities, to actively participating in the classroom, to participating in time-intensive activities called high-impact practices (Axelson and Flick, 2011). The reality is that whether students are engaged at the most basic level or at a higher level, research suggests that the more students connect to something meaningful on college campuses, the more likely they are to persist and feel like they belong (Kuh, et. al, 2010). The resulting research involved a review of the literature and an archival review that resulted in a campus exhibit that integrates photos with a research based narrative on student engagement. The exhibit provides a visual representation of engagement as a narrative highlighting the complexity and benefits of student engagement at all levels. In addition to, the exhibit increases awareness of how student engagement has evolved over time at NIU and will be used to encourage new conversations about the future of student engagement at NIU.
Medical diagnostics is a crucial, yet expensive component in the medical field today. With that, it can become unavailable to many people, restricting them access to the treatment they need. This project focuses on the idea of paper-based diagnostics with microfluidic and capillary action. Using paper-based materials will reduce the cost significantly, having a similar effect. Here, the project combines polymer microfluidics with paper fluidic valves to control the flow of reagents in a programmed manner. A successful integration of these valves ensures autonomous operation of diagnostic assays in a simple polymer/paper microfluidic platform. This will be achieved by creating a single-channel device using filter paper, mylar, double sided tape, laminate sheets, and blotting paper to absorb the flow. A stop valve will be created by treating the paper with polyelectrolyte multilayers, giving the paper fibers a net positive charge. Solution containing negatively charged nanoparticles when flown through this valve results in the electrostatic adsorption, letting the particles bind to each other, restricting the flow, and eventually stopping the flow completely. Our initial prototypes suffered from leakage and we are currently working on improving our design to reduce leakage in the channels. Testing a closed, single channel device using gold nanoparticles, with glass microfiber paper as the drain. Doing that, the gold nanoparticles reached the drain in less than 30 seconds and showed no leakage. The end goal of this project is to find a way to stop the flow on demand.
The Arduino is a microcontroller platform that can be used to create various sensing and control projects ranging from detecting light to controlling the motion of a robotic manipulator. This project focuses on building a graphical user interface (GUI) for a system that uses an Arduino microcontroller to control the temperature of a chemical tank for a printing ink manufacturing process. Building on the previously developed Arduino control system that is working satisfactorily, the added GUI would facilitate the control and monitoring of the system by any factory worker without the need to know how to change the code of the Arduino directly.

Cadaver dissection is crucial in today’s modern society in regards to education. It is a requirement for medical students, any type of biology major, and in most public school districts. Aside from being performed in an educational institution, cadaver dissection is also beneficial in the field of forensics, which determines the death of a victim involved in a crime. I, myself, have chosen a career in postmortem examinations after I earn my master’s degree in human anatomical sciences; therefore, this project will be beneficial in my current education as well as my future job career.

In this project, I will be dissecting a cadaver whom has died of congestive heart failure (CHF). My goal is to determine the type of CHF in which she had that ultimately caused her death and the long term effects it had on her body in specific. There is no possible prediction I have at this time as I have yet to dissect the heart itself.
The United States 116th Congress has been factually proven to be the most diverse Congress in the country’s history, with 131 members total being women. Additionally, more than one-in-five members are racial and/or ethnic minorities.

One might ask how exactly this diversity came to be. This study focuses on media-related campaign strategies, which have proven to be the largest factor. Candidates (and later-elected officials) often utilized social media as a way to connect with constituents and create more accessible politics for an increasingly diverse United States.

This study also focuses on the importance of this ever-growing political and social diversity in the United States, specifically as to why this matters for the future of America.

Within this project, I will be studying the psyche of various audiences at NIU—more specifically, gauging the opinions of various students and staff when it comes to East Asian films and animation. My main purpose in performing this research is to apply it to my perceived career in animated film-making. I’d like to understand the specifics of what in foreign media that causes many people to shy away from the concept, despite its potential to be quite captivating and thought provoking.
Abstracts: Sycamore High school

Please note: All abstracts are printed as submitted by project participants, and are represented in the college of the student’s project.
401 Sophia McComb
*A Comparison of Substrate Preferences for Native and Invasive Mussel Populations in the Kishwaukee River*
Presenter(s): Sophia McComb, Madeline McCormick
Session Time: Session 2

Freshwater mussels (family: Unionidae) are particularly important for the preservation of local freshwater aquatic habitats and environments. Of increasing priority is examining the relationship between the growing population of non-native *C. fluminea* and the survival of the species in aquatic environments, as well as the discovery of any substrate preferences. Many of the articles reviewed indicate that the scientific community studying freshwater mussels has paid great attention to the latter, but very few studies focus on a relationship between non-native *C. fluminea* and native mussel populations. Two sites were surveyed within the East Branch of the South Branch of the Kishwaukee River sub-watershed. A total of over 100 randomly selected quadrats were surveyed for substrate composition, native mussel species, and non-native mussel populations. Significant correlations were found between both native and non-native populations to the percentage of sand in the substrate, as well as a strong positive correlation between *C. fluminea* populations and the presence of native species. Important in the consideration of these results is the late period of survey in the freshwater mussel activity season, and the relatively small sample size of the study. The results, with consideration to the limitations of the study, suggest the dominance and strong adaptive ability of *Corbicula* (Sousa, et al. 2009). This also presents a need for further examination of the relationships between native and non-native species, and the containment of invasive population growth.

402 Griffin Nelson
*The Effects of Riparian Zone Size on Water Chemistry*
Presenter(s): Griffin Nelson
Session Time: Session 1

The environment around a water source has profound impacts on the quality and chemical composition of the water supply. In order to maintain the safest water source for human consumption and the most favorable habitat for the ecosystem it harbors, rivers must be afforded proper conditions to flourish. By examining the chemical content of multiple locations within the East Branch of the South Branch of the Kishwaukee River subwatershed and comparing the width of the riparian zone and the dominated area surrounding the river, a correlation between these factors can be discerned. The findings of this research will provide a basis of comparison to identify stream restoration opportunities to improve chemical concentrations of a healthy watershed. By disclosing the effects of riparian width and dominated floodplain area on water chemistry, further proposed actions can be taken to ensure the best conditions for the Kishwaukee River Watershed.
The purpose of this study is to compare the water chemistry and freshwater mussel populations in specific locations within the East Branch of the South Branch of the Kishwaukee River sub-watershed (EBSB). Native Mussel populations have been declining in the EBSB sub-watershed and a reason for the decline has not been determined at this time. The location studied was Union Ditch 3. The following chemical parameters were measured using an Exact Micro20 digital water tester; nitrate, nitrite, phosphate, sulfide, and sulfate. Mussel populations were measured using a man hour survey technique. No significant correlations were found between mussel populations and the chemical parameters measured but there was a moderate positive correlation between mussels and sulfates/sulfides, and a moderate negative correlation between mussel populations and nitrate levels. It is difficult to say whether the chemical levels accounted for have a direct impact on the number of mussels because of the lack of data throughout a year’s duration. Because of this, it is imperative that more data is collected for a more accurate representation of the possible effects of chemicals on mussel populations. The data suggests that increased nitrate levels are adversely affecting the mussel population and that the other mentioned chemicals are positively affecting the freshwater mussel population or having a minimal impact.

As more people come to realize the importance of protecting species diversity and examining the habitats and living conditions of organisms, the study on the connection between habitat quality and organisms is needed more than ever. Water quality is the leading factor in determining the biological integrity and organism diversity of a stream. Without fully understanding how water chemistry influences the catchment’s biological integrity, further studies on species recovery and organism population dynamics are likely to be deemed ungrounded. This research, involving field research and data gathering in the Kishwaukee River, focuses on how water chemistry and stream quality impacts the population fluctuation of mussels in the river (specifically in the Russell Woods catchment and East Branch of the South Branch of Kishwaukee River). A correlational study was done, indicating whether a negative change in stream quality correlates with a decline in both native and invasive mussel populations.
405     **Tom Kruis**  
The effect of temperature on **Thamnophis radix**  
**Presenter(s):** Tom Kruis, Josh Burns, James Barrowman, Bryce Sandy  
**Session Time:** Session 2

This project was conducted to better understand the effects of temperature on the activity of **Thamnophis radix**, also known as the plains garter snake. The data was collected at Afton Forest Preserve in Dekalb County, Illinois from September to November in the summer of 2018. Research had previously been documented by a college student attending Northern Illinois University. Within the short period in which data was collected, the results showed that there was no correlation between the temperature of the cover board and the amount of snakes found. Due to a limited amount of data, the research was inconclusive, but with further research and added data better results could be found.

406     **Abby Krull**  
The Population of Freshwater Gastropods in the EBSB  
**Presenter(s):** Abby Krull, Ashley Parks  
**Session Time:** Session 3

Throughout the East Branch of the South Branch of the Kishwaukee River (EBSB) subwatershed a total of three common freshwater gastropods were observed: Physella integra, Lymnea stagnalis, and Planorbus truncata. There has been limited research regarding the diversity and population of these organisms in the local watersheds in the past. In the study, due to collecting data in a delayed time frame, the collection of these gastropods were executed in an unconventional way. Using freshwater gastropods collected in years ranging from 2014 to 2018, the study utilized pre-collected jars of various macroinvertebrates that included the three most common species listed previously. The species were identified using a dichotomous key supplied by researcher Rachael Vinsel. Due to the varying methods employed by past students, it is impossible to accurately identify a correlation within the data. The three most common species of freshwater gastropods in the EBSB were, as mentioned beforehand, Physella integra, Lymnea stagnalis, and Planorbus truncata. Further conclusions will be procured with a continuation of the study. Future plans have been proposed that involve an agreed upon method of collection for all areas and collectors. In addition, a correlation between stream health of the specific streams and the abundance of the species will be sought after. Stream health will be determined by the QHEI rating, and the quantitative populations of the gastropods will be obtained through the agreed upon method.
407  Emalyn Polz  
Dark Band Spacing in Relation to age of Freshwater Mussels  
Presenter(s): Emalyn Polz, Hannah Vogel, Gavin Anderson  
Session Time: Session 2

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 Stedola 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 the improvement of local streams. During surveys throughout the EBSB subwatershed the number, species, and age of mussels were recorded. In a large number of the mussels observed, it seemed as though the spacing between dark bands on the valves were closer together as mussels grew older. The hypothesis being tested questions if, in their natural environment, freshwater mussels have a steady decline in growth as they age. The distance between each mussel’s growth rings was measured and recorded to determine how fast or slow they grew in the past years. The number of rings was 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. Measurements showed a correlation between age and growth of $r = -0.994$. This correlation shows that as a mussel ages, the space between its dark rings decreases.

408  Lily Wetzel  
Presence of Corbicula Fluminea in Kishwaukee Watershed  
Presenter(s): Lily Wetzel, Jacob Jovanovich  
Session Time: Session 3

Corbicula fluminea is an extremely invasive freshwater aquatic species that have ravaged American watersheds since the 1930s (Foster et al. 2012). Their short lifespan, high fecundity, and rapid growth account for their ability to quickly inhabit and decimate a well established, healthy ecosystem. This project uses information from a variety of studies to identify the areas in which C. fluminea have inhabited the East Branch of the South Branch of the Kishwaukee River subwatershed. A total of ten sites in Dekalb and Kane County were tested for the presence of C. fluminea; the East branch of South Branch at Bethany road, the South Branch at Russell Woods Forest Preserve, the East Branch of the South Branch at Motel road, Heron Creek at Motel road, Union Ditches 1-3, and Virgil Ditches 1-3. Two methods were used to sample mussel populations, random-systematic quadrat sampling as described by Strayer and Smith (2003), and a standard man hour survey. Two of the sites, Russell Woods and the East Branch of South Branch at Motel road, had an active presence of C. fluminea. Monitoring the presence and movement of corbicula in the Kishwaukee watershed is important because if gone unnoticed, the invasion of C. fluminea could be detrimental to our local watershed and lead to the decline of native species.
Charlotte Salis  
Effects of Landscape Variables on the Water Chemistry of Streams  
Presenter(s): Charlotte Salis  
Session Time: Session 2

Water chemistry is an important aspect of all healthy streams, and one of the major factors that can affect those values is the way the riparian zone around a stream is used. In this report, a variety of chemical values and riparian zones for 8 stream sites within the East Branch of the South Branch of the Kishwaukee River subwatershed were measured, looking for a correlation between water chemistry and riparian zone width/riparian quality. Micro20 digital instruments were used to measure phosphorus, nitrogen, ammonia, conductivity, and pH. Water chemistry typically has an average positive correlation of 0.0536760844 for riparian zone width and and average positive correlation of 0.0874432626 for flood plain quality. The average riparian width for these streams is 11 m. Almost all of the streams have row crop or another agricultural use for their floodplains; therefore, there is not enough diversity in the floodplain zone of the Kishwaukee Watershed to determine which type of surrounding land is best for water chemistry.

Wyatt Strohacker  
The Effectiveness of Varying types of cover boards on the population of Thamnophis Radix.  
Presenter(s): Wyatt Strohacker, Jared Grubbs, Brayden Crome, Alyssa Cooley, Elijah Gentry,  
Session Time: Session 2

The purpose of this research was to obtain a better understanding of Thamnophis radix population, and experiment with varying types of cover-boards at Afton forest preserve, Dekalb County Illinois. Previous research was conducted by a student intern at Northern Illinois University and a lead biologist for Dekalb County forest preserve who had previously implemented two types of cover boards within the researched transects (plywood and rubber). Research started early September, 2018 and continued until hibernation season, October-December. Before corrugated metal was implemented, research was conducted on four different occasions. Of all research, the only type of cover-board T. radix was found under was the rubber boards. Corrugated metal was then applied to the study sites. The only evidence of snake activity found under the corrugated metal cover-boards was one snake shed approximately 11 inches. Due to the short amount of time research was conducted not enough data was found to come to a decisive conclusion. With another season of research more data could be collected producing better results for the experiment.
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