UNDERGRADUATE RESEARCH AND ARTISTRY DAY
COMMUNITY ENGAGEMENT SHOWCASE

TUESDAY, APRIL 25, 2017
HOLMES STUDENT CENTER
Office of Student Engagement and Experiential Learning
Open to Campus and Community

Northern Illinois University
Your Future. Our Focus.
Letter from the Office of Student Engagement & Experiential Learning

Welcome to the 8th annual Undergraduate Research and Artistry Day! From research on prison industrial complex to artistry projects that explore feminism in Chilean music to community engagement projects focused on the effect that our Huskie Food Pantry has on food insecurity at NIU, 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, and Undergraduate Research & Artistry Day and Community Engagement programs like Huskie Service Scholars and NIU Service Leaders 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!

Renique Kersh, Ph.D.
Associate Vice Provost for Engaged Learning
Director, Office of Student Engagement and Experiential Learning
Letter From the President

Since the start of my presidency, I have talked a great deal about preparing our students to be successful in their lives and careers. Today, at Undergraduate Research and Artistry Day, you have an opportunity to meet hundreds of students and faculty who provide excellent examples of what can be accomplished when we embrace that concept.

All of these students have embraced opportunities to learn and grow outside of traditional classroom situations. They also have benefitted tremendously from working under the mentorship of some of our top faculty and researchers. In doing so, they are participating in the highest forms of learning – not just memorizing or synthesizing information from lectures and textbooks, but contributing new ideas and new works of art to the existing body of knowledge and culture.

They are having the sort of transformational learning experiences that not only help them stand out among their peers on campus, but which also provide them with the tools to succeed throughout their lives.

So, as you walk the aisles today, I encourage you to interact with these students. Ask them questions not only about their projects, but also about how the work has enriched their education and helped them grow in exciting and unexpected ways. Then join me in working to build such experiences into the education of every student who enrolls at NIU.

Doug Baker

Letter From the Executive Vice President & Provost

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
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Undergraduate Research & Artistry Day Awards

The following awards will be given to the winning project in each category:

STEM: Science, Technology, Engineering, Math
AEHHSS: Arts, Education, Health, Humanities, and Social Sciences
Exhibits

First - $200
Second - $150
Third - $100

Community Engagement Showcase Awards

The following awards will be given to the winning projects:

First - $200
Second - $150
Third - $100

Schedule of Events

Viewing of Projects
( presenters will rotate throughout the event) 9:00am - 2:30pm

Session 1
Session 2
Session 3
Session 4
9:00am - 10:15am
10:15am - 11:30am
11:30am - 12:45pm
12:45pm - 2:00pm

Community Engagement Showcase 12:00pm - 2:00pm

Engaged Learning Presentation 2:00pm - 2:30pm
( featuring the Child Development Lab)

Awards Ceremony 2:30pm - 3:30pm
(All participants are encouraged to attend)
URAD Judges

E. Taylor Atkins; History
Nicholas Barber; Biological Sciences
Sheila Barrett; School of Health Studies
Brian Berchtold; Office of Student Academic Success
Tashena Briggs; Housing and Residential Services
Anne Brit; Psychology
Andy Bruno; History
Sachit Butail; Mechanical Engineering
Dhiman Chakraborty; Physics
Kyu Cho; Mechanical Engineering
Peter Chomentowski; Department of Kinesiology and Physical Education
Jacie Collum; College of Business
Gabriela Crespo; Division of Information Technology
Steve Daskal; Philosophy
Michael Eads; Physics
Sherine Elsawa; Chemistry and Biochemistry
Elizabeth Gaillard; Chemistry and Biochemistry
Larissa Garcia; Library
Valerie Garver; History
Kenneth Gasser; Chemistry and Biochemistry
Kim Gatz; Communication
Thomas Gilbert; Chemistry and Biochemistry
Scott Grayburn; Biological Sciences
Pettee Guerrero; National Safety Education Center, College of Engineering and Engineering Technology
Liping Guo; Engineering Technology
Timothy Hagen; Chemistry and Biochemistry
Anne Hanley; History
Liz Hanrahan; Psychology
Ted Hogan; Technology
Pi Hsu; Educational Technology, Research and Assessment
Laura Johnson; Educational Technology, Research and Assessment
Daniel Kies; School of Theatre and Dance
Mary Koren; Nursing
Ashley Kyle; School of Health Studies
Jessica Labatte; School of Art and Design
Kathy Ladell; University Libraries
Karen Lichtman; Foreign Languages
Sarah Lindell; International Affairs
Amanda Littauer; History; Center for the Study of Women, Gender and Sexuality
Laurence Lirio; Physics
Jessica Martinez; Kinesiology and Physical Education
Lucero Martinez; Counseling, Adult and Higher Education
Liz McKee; Student Involvement and Leadership Development

Miriam Meza; Student Involvement and Leadership Development
Ken Miller; School of Theatre and Dance
Cliff Mirman; Technology
Scott Mooberry; Environmental Health and Safety
Nina Mounts; Psychology
Shanthi Muthuswamy; College of Engineering and Engineering Technology
Peter Olson; Art Museum
Nestor Osorio; University Libraries
Nick Pohlman; Mechanical Engineering
Brad Sagarin; Psychology
Iman Salehinia; Mechanical Engineering
Jeff Salmon; Military and Post-Traditional Student Services
Alicia Schatterman; Public Administration; Center for NGO Leadership and Development
Bob Schneider; School of Theatre and Dance
Masih Shokrani; School of Health Studies
Andy Small; Chemistry and Biochemistry
Joel Stafstrom; Biological Sciences
Christian Steciuch; Psychology
Amy Stich; Leadership, Educational Psychology and Foundations
Matt Streb; Political Science
Mandy Stutenberg; Foreign Languages and Literatures
Prof Tatara; Technology
Nathan Tripp; Center for NGO Leadership and Development
Leanne VandeCreek; University Libraries
Michael Vega; Chemistry and Biochemistry
Emily Vitrano; School of Theatre and Dance
Patty Wallace; Psychology
Roland Winkler; Physics
James Wolter; Biological Sciences
Zhili Xiao; Physics
Sally Yacout; Chemistry and Biochemistry
Jill Zambito; Student Involvement and Leadership Development
Shuqi Zhang; Kinesiology and Physical Education
Donald Zinger; Electrical Engineering

CES Judges

Tashena Briggs; Housing and Residential Services
Emily Faulkner; DeKalb Public Library
Ashley Kyle; School of Health Studies
Lucero Martinez; Counseling, Adult and Higher Education
Liz McKee; Student Involvement and Leadership Development
Jeff Salmon; Military and Post-Traditional Student Services
Undergraduate Research & Artistry Day Exhibits

Resource Table

DUKE ELLINGTON BALLROOM ENTRANCE
Event Map (Duke Ellington Ballroom)
Abstracts

Table Talks

Please Note: All abstracts are printed as submitted by project participants, and are represented in the college of the student’s project.

R denotes Research Rookies
SEF denotes Student Engagement Fund (SEF)
SROP denotes Summer Research Opportunities Program (SROP)
U denotes Undergraduate Special Opportunities in Artistry and Research (USOAR)
Nicholas Casas
Identifying Predictors of Congressional Incivility: An Individual-Level Analysis

Author(s): Nicholas Casas
Department: Political Science
Faculty mentor(s): Scot Schraufnagel
Session Time: 9:00am - 10:15am
Table Number: 1

This research explores what background characteristics are more closely associated with uncivil acts by members of Congress, while serving in Congress. Put differently, the research seeks to identify biographical attributes that predict uncivil member behavior. The time period of the study is the 45th (1877-78) through the 113th Congress (2013-14). Each implicated member is compared, randomly, with another member from their political party, their chamber, and their Congress, holding constant these factors as possible explanations for uncivil acts. Independent variables tested include: legal education and experience, judicial experience, state legislature experience, ideological alignment, congressional leadership, being the chair of a standing committee, and gender. The analysis suggests both leadership roles, state legislative experience, and gender associate with civility in the hypothesized manner. However, the test of legal background confirms the null hypothesis, there is no statistically significant difference between those implicated and their matched pair.

Tim Green
Momentum Filter & Political Economy Filter

Author(s): Tim Green
Department: Finance
Faculty mentor(s): Sukesh Patro
Session Time: 9:00am - 10:15am
Table Number: 1

Part One, Momentum Filter: The idea that the stock market has momentum is one certainty up to debate. In the book A random walk down wall street, Burton Malkeil discusses the fact that chartists believe there is momentum in the market. However, he states that the previous prices of a stock are not a good indicator in determining what its future price will be. The goal of this study is to determine whether the pervious price of stock is a good indicator to what the price will be in the future. This project does this by assuming the bottom ten percent of stocks will continue to do poorly while the top ten percent of stocks will continue to be successful. Specifically, I will be looking at the years 1926, 1931, 1945, 1950, 1965, 1978, 1983, 1995, 2006 and 2010. I will be determining the top and bottom ten percent of stocks for the first six months of the year. Once determined, I will test whether it would be effective to short the bottom ten and buy the top ten for the next six months of the year. The goal is to determine whether this is an effective and safe way of investing money in the market. If proven true it will help any investor feel more confident in investing his or her money in the market in this fashion. Part Two, Political Economy Filter: Nothing in our society today is debated more than which presidential candidate or party will be the best for the economy. In this part, I question what type of president produces the most beneficial economic outcome in the United States. I will look at the difference between Republicans vs. Democrats, and I will determine how the market reacts as the power switches from an incumbent to a new president. I will look at the difference in how the economy performs with a one-term president versus a two-term president. Finally, I will rank all the presidents from Calvin Coolidge to Barack Obama to determine who did the best for the economy and who did the worst. I hope to find constancy in what type of president will have the best impact on the economy. This project will help any voter who is concerned with the economy make a more educated decision on election day.
Ashley Grazutis
*Curriculum Effectiveness of Middle School Science Classrooms: Curriculum Relevancy for a Forever Changing Society*

Author(s): Ashley Grazutis  
Department: Curriculum and Instruction  
Faculty mentor(s): John Evar Strid  
Session Time: 9:00am - 10:15am  
Table Number: 1

With the intention of learning more about the societal effectiveness of the middle school science curriculum, this project examines the insights of students directly impacted by the curriculum in order to learn more about the relevancy of the curriculum in meeting the goal of creating competent and engaged citizens. More specifically, through a survey, this research describes the extent to which the middle school science curriculum is relevant to meeting the everyday societal needs of these students. This project documents engaged learning experiences in the science classroom through a 10 question survey where students have to rate, choose and reflect on the experiences they have had in their science class. With these insights, a clearer picture on the current effectiveness of the middle school science curriculum in creating competent and engaged citizens can be reached. This in turn can expose the possible need for a science curriculum that is more relevant to the modern day customs of the societies they engage in.

David Lorenzo
*Practical Wisdom, Moral Incongruency and Akrasia: A Defense of Practical Wisdom*

Author(s): David Lorenzo  
Department: Philosophy  
Faculty mentor(s): Jason Hanna, Steve Daskal  
Session Time: 11:30am - 12:45pm  
Table Number: 1

In their chapter in the Moral Psychology Handbook, “Character”, Merritt et al. argue that the “virtue ethical model of practical rationality” is empirically inadequate. The virtue ethical model of practical rationality, also called “practical wisdom,” is a crucial aspect of any virtue ethical theory. Merritt et al.’s conception of practical wisdom is the ability to deliberate well in morally relevant situations and, in light of that deliberation, choose the right course of action. Psychological studies seem to show that practical wisdom is seldom, if at all, found in people and further that it is near impossible to acquire. So, practical wisdom seems empirically inadequate. I argue that Merritt et al.’s use of “practical wisdom” is simply misunderstood. With a narrow focus on deliberation, Merritt fails to differentiate between someone’s ability to deliberate at all, someone’s ability to deliberate well, and what kind of situations these deliberations really matter. I also argue Aristotle flags that the existence of ‘akrasia’, literally ‘lack of mastery’, in individuals is one reason people often fail to deliberate well. But, the existence of akratic individuals is not a problem for Aristotle’s practical wisdom because he is not making a general claim about the features of human cognition, but is in the business of describing a virtue of practical reasoning, practical wisdom. I also discuss a couple ways to interpret the cited experiments that do not discount practical wisdom.
Zahra Muhsin
"Bad Kids: Punitive Discipline and the Faces behind the Pipeline (Short Documentary)

Author(s): Zahra Muhsin
Department: English
Faculty mentor(s): Bradley Peters, Laura Vazquez
Session Time: 11:30am - 12:45pm
Table Number: 2

This project will be a continuation of my research from last year involving the prison industrial complex and punitive discipline in schools. In last year’s research, I created a magazine that highlighted the major issues, consequences, and problems regarding punitive discipline. This online magazine tool was beneficial for presenting my research, and people were interested in learning more about this negative form of discipline that permeates schools in the United States. Despite evidence that crime rates among adolescents have been decreasing throughout the last few decades, suspensions, expulsions, and arrests have increased markedly with children and adolescents (Heitzeg 2009). This evidence suggests that the level of discipline being used does not serve a positive purpose or beneficial outcome. Last year’s research focused on the statistics and produced a clinical analysis of the problem. This year, the documentary will highlight students’ individual stories and professionals’ opinions about this issue. The United States imprisons five times more children than any other nation in the world and two-thirds of kids incarcerated, never go back to school when released (Kids for Cash, 2014). These alarming statistics warrant an in-depth look. Perspectives shown in the documentary come from clinical and educational environments including viewpoints from teachers, students, and practitioners of law and mental health. Seeing the faces behind that statistics has the potential to move more people to activism regarding changing the juvenile and educational systems.

Abby Ferree, Halle Hoffman
Devising Theatre: Historical Women’s Health On Stage and Off

Author(s): Abby Ferree
Department: Theatre and Dance
Faculty mentor(s): Heather Corwin
Session Time: 11:30am - 12:45pm
Table Number: 2

Devised theatre creates a whole different kind of experience than any other type of theatre. It is written through the collaboration of a certain group of individuals, performed, and then generally never remounted. Devised theatre can only be what it is because of the particular individuals that collaborated on the piece, which is why it is usually never performed again. This research will explore how devised theatre about can challenge actors in their craft. It will explore both the creation process from the perspective of the actor and the story from the historical perspective. This will be accomplished through participation in Northern Illinois University’s devised production of The Yellow Wallpaper.
Abstracts

Posters

Please Note: All abstracts are printed as submitted by project participants, and are represented in the college of the student’s project

\^R denotes Research Rookies
\^SEF denotes Student Engagement Fund (SEF)
\^SROP denotes Summer Research Opportunities Program (SROP)
\^U denotes Undergraduate Special Opportunities in Artistry and Research (USOAR)
1. **Abigail Roemer**
*Development and Validation of the Competency Model for the Jobs PLUS Program at Northern Illinois University*

   Author(s): Abigail Roemer  
   Department: Management  
   Faculty Mentor(s): Terrence Bishop  
   Session Time: 12:45pm - 2:00pm

The broad objective of this project is to further develop the Competency Model for Northern Illinois University’s Jobs PLUS Program. The more specific purpose is to externally validate the model through survey research. This Research Rookies project is a continuation of last semester’s Jobs PLUS competencies research to create the program’s Competency Model. The primary benefit of this project is to validate the Competency Model by comparing and analyzing the survey results to serve as a foundation for the Jobs PLUS Program. The Competency Model will guide programming for the professional development sessions as well as allowing the program to be communicated effectively. With the data collected from surveying current employers, hiring agents, and alumni the Jobs PLUS Competency Model will be finalized and validated for planning use with the program.

2. **Kyle Jacobsen**
*Conflict Within Groups and How It Affects Trust*

   Author(s): Kyle Jacobsen  
   Department: Management  
   Faculty Mentor(s): Amanda Ferguson  
   Session Time: 9:00am - 10:15am

This paper looks at the relationship between trust and task conflict in small groups. After reviewing literature within the field, it has become clear there has been a portion of this relationship that has been overlooked. I will be looking at the relationship between trust and task conflict and the possibility that experiencing task conflict can increase trust levels in a group. I expect to see increased trust within small groups when they experience task conflict, but not when this conflict goes unresolved. I believe this assumption will heavily depend on how or if the conflict is resolved. I will be exploring this question through two different studies, the first will be a pair of surveys measuring change over time possibly after conflict has been experienced. The second will be a quasi experiment over the course of a particular class project measuring if there is a correlation between the overall trust in the group and the conflict experienced by the group.

3. **Morgan Morris, Ryan Evers, Sergiy Grudakov, Nube Falconi, Sancha Ogden, Edward Selep, Lisa Wade, Rory Johnson**
*Drivers of Retention and Turnover in Production Facilities: A Qualitative Exploration*

   Author(s): Morgan Morris, Ryan Evers, Sergiy Grudakov, Nube Falconi, Sancha Ogden, Edward Selep, Lisa Wade, Rory Johnson  
   Department: Management  
   Faculty Mentor(s): Mahesh Subramony  
   Session Time: 12:45pm - 2:00pm

Retention of skilled employees is a strategic priority for organizations competing on the basis of quality and customer satisfaction. In this poster, we present the process followed by a team of 12 undergraduate management students to identify the drivers of employee retention and turnover at three production facilities in Northern Illinois. Utilizing focus groups with production workers, interviews with production supervisors, naturalistic observations, and archival data, we discovered multiple reasons why workers stay or leave their employment. Among these, supervisory style and work-role related factors, were found to be primary. As a result of participating in this experiential-learning research project, we also identified and developed a variety of professional skills related to managerial effectiveness in the workplace.
4  Elizabeth Hipskind  
*Analyzing Effective Instructional and Classroom Management Approaches for Young Culturally-Diverse Learners*

Author(s): Elizabeth Hipskind  
Department: Special and Early Education  
Faculty Mentor(s): Gregory Conderman  
Session Time: 9:00am - 10:15am

Educate US is an opportunity that seeks to broaden and cultivate the views and experiences of teacher candidates through a rigorous week-long classroom experience in a demographically and geographically different area of the country. The experience also provides candidates with opportunities to observe and reflect upon best-practices in teaching children from various cultures using a personal ethnographic case study approach. Ethnographic research is especially appropriate when describing how a cultural group works and exploring their beliefs, language, behaviors and issues faced by the group. This type of research is a) field-based as it is conducted in natural settings; b) personalized as it is conducted by researchers who are in daily contact with the individuals they are studying; and c) multifactorial as it is conducted through the use of two or more data collection techniques. This poster will describe an undergraduate special education teacher candidate's reflection of her Educate US experience in Houston, Texas, which took place from January 8-January 13, 2017 using observations and interviews. The participant spent numerous hours working directly in a classroom with children representing diverse cultures. The reflection will include insight into this experience. The poster will note perceptions of the professional and personal development that took place over the course of the experience. The poster will also describe specific instructional and classroom management approaches that were used and the research base for such approaches. Implications for teaching young children representing diverse cultures will also be shared.

5  Ashley Grazutis  
*Curriculum Effectiveness of Middle School Science Classrooms: Curriculum Relevancy for a Forever Changing Society*

Author(s): Ashley Grazutis  
Department: Curriculum and Instruction  
Faculty Mentor(s): John Evar Strid  
Session Time: 10:15am - 11:30am

With the intention of learning more about the societal effectiveness of the middle school science curriculum, this project examines the insights of students directly impacted by the curriculum in order to learn more about the relevancy of the curriculum in meeting the goal of creating competent and engaged citizens. More specifically, through a survey, this research describes the extent to which the middle school science curriculum is relevant to meeting the everyday societal needs of these students. This project documents engaged learning experiences in the science classroom through a 10 question survey where students have to rate, choose and reflect on the experiences they have had in their science class. With these insights, a clearer picture on the current effectiveness of the middle school science curriculum in creating competent and engaged citizens can be reached. This in turn can expose the possible need for a science curriculum that is more relevant to the modern day customs of the societies they engage in.

6  Kayla Scheel  
*Teachers’ Use of Non-Academic Data for Decision-Making Purposes*

Author(s): Kayla Scheel  
Department: Educational Technology, Research and Assessment  
Faculty Mentor(s): Todd Reeves  
Session Time: 11:30am - 12:45pm

Today's K-12 educators are expected to be able to use data to inform their decision-making in the classroom. In addition to academic assessment data, teachers are also expected to work with non-academic data, such as data on student behavior, social skills, learning behaviors and processes, and school climate. Non-academic data often denote important schooling outcomes in their own right, but can also be used to understand reasons for a student's academic performance. We conducted a survey research study to support understanding of the distribution of in-service teachers’ use of non-academic data when making decisions for educational purposes. The survey comprised close-ended questions which addressed the key domains reflected in theories of data use: 1) access to non-academic data, 2) analysis and interpretation of non-academic data, 3) frequency of use of non-academic data, and 4) types of use of non-academic data. This knowledge can be helpful for building professional development for teachers around data use. Non-academic factors and data use have become increasingly important topics in both policy and practice, and it is important to both understand and build teachers’ capacity to use non-academic data productively and responsibly.
7  Mikaela Keeney*a
Effectiveness of Essential Oils in Anxiety among Individuals with ASD

Author(s): Mikaela Keeney
Department: Educational Technology, Research and Assessment
Faculty Mentor(s): Toni Van Laarhoven
Session Time: 12:45pm - 2:00pm

For centuries people have used Essential Oils and aromatherapy as a supplementary aid for numerous ailments. These include pain relief, alleviation from anxiety, assisting with sleeplessness, and stress management. Very little focused research has been done on the effects of essential oils on anxiety in people with Autism. The objective of this research is to discover whether or not essential oils and aromatherapy provide a true and measurable effect on anxiety in people with Autism. A consistent positive change in measured physiological stress-related biomarkers and observed behaviors when calming essential oils are used is expected. Keywords: Essential oils, aromatherapy, anxiety, Autism, biomarkers, behavior.

8  Luis Hernandezb, John Manning
The Effects of Non-Conventional Wii Exergame Usage on Balance and Fall Prevention in Older Adults

Author(s): Luis Hernandez, John Manning, David Benner
Department: Kinesiology and Physical Education
Faculty Mentor(s): David Benner
Session Time: 11:30am - 12:45pm

BACKGROUND: Usage of exercise-based games, or “exergames”, has shown promise as a potential alternative to traditional exercise programs in enhancing balance and decreasing risk of falls in older adults, most research utilizing the Nintendo Wii’s Wii Fit title, although a scarcity in the literature exists with regards to the efficacy of other exergames. This study aimed to investigate the effects of a puzzle-based exergame intervention as compared to a conventional Wii Fit intervention. METHODS: A total of 12 older adults were recruited to participate in the study and were randomized into two groups: a control/conventional exergame group (“CEG”) and a variable/puzzle exergame group (“PEG”). The PEG, n=7, and CEG, n=5, were both exposed to 30 minutes of Wii play twice a week for a duration of 6 weeks, assessments done with regards to mediolateral stability, static postural stability, and fall risk the weeks pre-and-post intervention. RESULTS: Both groups showed small to moderate ameliorating effects with regards to mediolateral stability and static postural stability, although inter and intra-group differences at and from pre-to-post intervention were all found statistically insignificant (p > .05). No difference in fall risk were seen in the PEG, although a large, but statistically insignificant, increase in was seen in the CEG, inter-group differences at post-intervention being statistically significant (p = .021). CONCLUSION: Exergame titles other than Wii Fit may be effective at enhancing balance and mitigating increases in fall risk in older adults, although we were unable to gain sufficient evidence to reject the null.

9  John Manningc, Luis Hernandez
Long Term Effects of Postactivation Potentiation Protocols on Lower Body Strength and Power Performance

Author(s): John Manning, Luis Hernandez
Department: Kinesiology and Physical Education
Faculty Mentor(s): Anthony Deldin, Peter Chomentowski
Session Time: 12:45pm - 2:00pm

INTRODUCTION: Postactivation potentiation (PAP) is an acute increase in muscle force production due to contractile history and has been shown to increase performance related markers such as vertical jump height and sprint velocity. Muscle force production, regulated by fatigue and PAP, experiences peak effects from PAP following the dissipation of fatigue. The primary underlying mechanisms for PAP are still unclear, however three mechanisms have been proposed: phosphorylation of myosin regulatory light chains, recruitment of higher order motor units, and an acute change in fiber pennation angle. While past research has primarily focused on the optimization of PAP protocols and elucidation of underlying mechanisms, no research has considered the potential for long term benefits. Thus, the focus of this study was to assess the potential long term benefits of PAP. METHODS: Ten college aged students were recruited and randomly assigned into either a control (n=5) or variable (n=5) group, both groups completing a conventional 6-week training intervention, the variable group exposed to an additional PAP inducing protocol. Measures of body composition, lower body strength, power, muscle force production, and electrical activity were taken pre-and-post intervention. RESULTS: No significant differences were noted in lower body strength, power, or muscle force
production (p>.05), although both control and variable groups exhibited large effect sizes from pre-to-post intervention with regards to electrical activity (g=0.85, g=0.65, respectively), however, difference in effect size between the groups was small (g=0.19). CONCLUSIONS: A 6-week PAP augmented training intervention resulted in no significant benefit over a conventional training intervention.

10  **Nicole Hoffmann**
**Optimizing Stability and Concentration of Dye-Doped Organosilicate Nanoparticles**

Author(s): Nicole Hoffmann  
Department: Electrical Engineering  
Faculty Mentor(s): Vennumadhav Korampally  
Session Time: 10:15am - 11:30am

This project will be undertaken with Dr. Vennumadhav Korampally from the Electrical Engineering department. It will be centered on optimizing the creation of nanoparticles. The fluorescent nanoparticles (NPs) have a hydrophobic core and a hydrophilic shell. This design allows for even dispersion in aqueous solutions with minimal dye leakage [2]. Part of this research process is optimizing the NP stability to prevent clumping of particles. When subjected to light, the electrons jump to an excited state and emit different wavelengths of light based on the dye when they return. This light can allow for detection of the NPs in biological applications; having different colored dyes allows for more options. These NPs will have altered concentrations and aging times to discover the best and cheapest process. Ultimately, the goal of NP research is to attach NPs to specific molecules/therapies that can help target cancer cells or better boost the immune system in a noninvasive way.

11  **Jacob Goes**
**Optical Detection Method of Epithelial Melanin**

Author(s): Jacob Goes  
Department: Electrical Engineering  
Faculty Mentor(s): Edward Miguel  
Session Time: 11:30am - 12:45pm

Vitamin D is essential to mammalian physiology. Producing essential quantities is of concern and difficult to measure. Devices have been designed to test vitamin D levels at the clinical level, but they do not produce results in real time, particularly after immediate UV absorption. The goal of this research is to refine an optical device that can measure human skin pigmentation changes before and after sun exposure to determine melanin levels essential to produce vitamin D.

12  **Grant Nonnemacher, Natalie Sheehan. Shekinah Bergmann**
**Increasing Throughput in the Physician Treatment Center**

Author(s): Grant Nonnemacher  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Purushothaman Damodaran  
Session Time: 9:00am - 10:15am

Over the past year the Physician Treatment Center at Central DuPage Hospital, part of Northwestern Medicine has seen a 21 per cent increase in patients over the past year and has recently felt as if they do not have enough space to accommodate the influx of patients coming into the center, as a result room utilization is at a level of 54.17%. The purpose of the study is to find a solution to the overcrowding without having to expand the physical size of the PTC. The team will increase the efficiency and productivity of the PTC by optimizing the schedule and minimizing the downtime of the PTC. The improvement goal for the team is to increase the room utilization from the current level to 65%.
13 Sterling Williams, Abdullah Almalki, Mohamed Seaid  
Driv-Lok Defect Analysis

Author(s): Sterling Williams, Abdullah Almalki, Mohamed Seaid  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Purushothaman Damodaran, Christine Nguyen  
Session Time: 10:15am - 11:30am

Using the six Sigma DMAIC (Define, Measure, Analyze, Improve & Control) tools, we are analyzing the blueprints for fasteners that Driv-Lok makes, to determine whether parts are safety critical or not. Safety critical parts are parts that, if defective, can cause substantial damage to The parts they go into and even injury to people. We are also analyzing the processes that the safety critical parts go through to determine if there are areas where defects are more likely to occur. With our findings, we can suggest and/or implement lean techniques to improve the quality of the parts, and improve the processes from which the parts are created.

14 Maxwell Tawiah Nelson, Mary Bernard, Anthony Buda  
Aurora Metals Reducing Late Orders

Author(s): Maxwell Tawiah Nelson  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Purushothaman Damodaran  
Session Time: 11:30am - 12:45pm

The team’s senior design project takes place at Aurora Metals. Aurora Metals creates custom metal parts for specific customer orders. These orders can range in size from something that can easily fit in your hand to a single part that is a few hundred pounds. These orders can range in quantity, alloy, size, shape, surface finish, vane shape and so on. With the wide variety of parts that are produced, there is also a wide variety of processes used as well. Due to the large variety of product and processes, scheduling becomes very crucial to the efficiency of the shop. One metric Aurora Metals uses to track their efficiency is looking at the amount of late orders. Per their data, in 2016, 23.2% of the orders were at least one day late. The cumulative days late of the late orders in 2016 is 11,327 days. Aurora Metals has given our team the task of finding out why there are so many late orders. Data of all orders shipped August 2016 through January 2017 was provided by the company. The data includes P.O. date, date the order was entered, scheduled plan date, promise date and shipped date. The team will analyze given and apply several tools such as Value stream Map and batch-size analysis to identify bottle neck; and then suggest ways to reduce these late orders.

15 Benjamin Rosenthal, Anugrah Lambogo, Abdurrahman Hariri Jamal  
Johnson Pumps Line Redesigned

Author(s): Benjamin Rosenthal, Anugrah Lambogo, Abdurrahman Hariri Jamal  
Department: Industrial and Systems Engineering  
Faculty Mentor(s): Purushothaman Damodaran  
Session Time: 12:45pm - 2:00pm

The purpose of this project is to design a new line layout for the Johnson Pumps line of SPX Flow in Rockford. In August 2016 SPX Flow moved its Johnson Pump lines from its facility in Hanover Park to its facility in Rockford. However, the product is in high demand so the production of Johnson Pumps couldn’t be stopped. Because of this, SPX Flow had to set up the new lines in a matter of days. This led to poor design in the line set up and poor efficiency in overall production. Our team has been tasked with creating a new manufacturing line design that will increase throughput of pumps, decrease material handling, and increase point of use of materials.
16  Christina Stich, Paul Metcalf, Mary Margeson
Minimizing Defects Identified in Canvas Products Produced on Range 1

Author(s): Christina Stich, Paul Metcalf, Mary Margeson
Department: Industrial and Systems Engineering
Faculty Mentor(s): Purushothaman Damodaran, Christine Nguyen
Session Time: 9:00am - 10:15am

Aurora Specialty Textiles Group (ASTG) is a textile processing company based in Aurora, Illinois. They have recently purchased wide width capable machinery to be able to produce wider goods. In moving to the new machinery, their scrap rate has increased, reducing their profits. Their current scrap rate is at 15-18% and the goal is for that number to be reduced to 11-12%. To reach this goal, the team is focused on using lean tools rather than a six-sigma approach because of a lack of data on wide canvas. The team’s first focus in this project has been creating neat, thin seams for when operators at ASTG are sewing two pieces of fabric together. We were able to use a machine that was already in house in order to vastly improve the quality of seams and have all but negated the defect of seam impressions in the fabric. The team has completed one trial run and has plans for at least one more. The first trial run was used to get a baseline of data for wide canvas. While the scrap rate was much higher than desired, at 35%, the team was able to root cause much of the defects. Wrinkling of the fabric was the majority contributor of scrap for the first trial run. We hope to fix the problems we observed before the second trial run. From our predictions, we believe we will be at the target rate of scrap.

17  Kevin Mulder
Woodward Inc. Torque Driver Verification

Author(s): Kevin Mulder Blake Feathers Omar Aburomi
Department: Industrial and Systems Engineering
Faculty Mentor(s): Purushothaman Damodaran
Session Time: 12:45pm - 2:00pm

Woodward Incorporated in Loves Park Illinois is attempting to transition from manual wrenches to Atlas Copco’s automated torque drivers in assembly throughout the facility. This transition will benefit the company in categories such as quality control, ergonomics, and efficiency. The implementation of the new tool requires high levels of verification considering this aeronautical industry has been using manual wrenches for over one hundred years. In order to prove to the company and its customers that their products will remain of high quality, we have designed experiments for verification. The two factors we have verified are the driver’s ability to apply and record seated and run-on torque values. We also designed a consistent technique to verify these drivers in all assembly operations. The final steps to the project were to prove ergonomics and efficiency benefits through the use of time studies and ergonomic analyses. The results of the study were extreme improvements in quality control, ergonomics, and efficiency. The recommendation to the company is to buy and implement Atlas Copco’s automated torque drivers throughout the facility.

18  Theodore Nelson, Mark Nabors, Dunya Dawood
Designing an Assembly Line for Linear Actuated Air Valves

Author(s): Theodore Nelson, Mark Nabors, Dunya Dawood
Department: Industrial and Systems Engineering
Faculty Mentor(s): Purushothaman Damodaran, Jaejin Hwang
Session Time: 9:00am - 10:15am

Forecasts completed by Woodward Inc. indicate a significant increase in demand for linear actuated air valves by the year 2030. The current state of this assembly cell consists of a one-worker bench process. Our design team has been tasked with designing an assembly line that will optimize the amount of time taken to assemble air valves, utilizing multiple work stations, to meet predicted demand. Emphasis on ergonomically sound workstations, with respect to parts placement, is also requested.
19 Brant Beland, Kyle Bodie, Jack Hillinger, Christian Procopio
*Vertical Axis Wind Turbine Tree*

Author(s): Brant Beland, Kyle Bodie, Jack Hillinger, Christian Procopio
Department: Mechanical Engineering
Faculty Mentor(s): Kyu Taek Cho, Jenn-Terng Gau
Session Time: 10:15am - 11:30am

The primary objective of our project is to design a tree-shaped wind turbine to utilize currently untapped low velocity wind streams available in many urban infrastructure formats for clean energy production. By conducting research on current turbine blade designs in use as well as conceptual models, a variety were chosen for their potential benefits in our intended application. After subsequent designing and testing for the most effective designs, it was found that designs utilizing drag as their source of rotation were found to be most successful and are to be used in our completed design. The particular arrangement of the individual turbine blades will utilize a two-leveled star-shape to guarantee little interruption in efficiencies from neighboring turbines in addition to keeping with an aesthetically pleasing tree-shape design. With the final prototype constructed, real-world application for urban format wind turbines may be further explored.

20 Kamila Krupiarz§, Hannah Higgins®
*Granular Flow Behavior in a Conveyor Apparatus*

Author(s): Kamila Krupiarz, Hannah Higgins
Department: Mechanical Engineering
Faculty Mentor(s): Nicholas Pohlman
Session Time: 9:00am - 10:15am

Uniformity of granular flow behavior is critical in many industries. The behavior in a conveyor apparatus aims to fill a gap in knowledge of achieving uniformity in mass flow rate by correlating velocity profile data with mass flow rate measurements and observing the difference, resulting in unwanted energy dissipation. Image data were collected for uniformly-shaped particles in a bottom-driven flow conveyor belt system from which a graph of the velocity profiles as a function of the particle’s position were created. The information on velocity was then used to determine how the flow velocity decayed as particle distance from the belt increased. These velocity relationships, differing upon the size of the particles, speed of the belt, and outlet size, will be compared to flow decay relationships found in past experiments that focused on gravity-driven systems. In these past experiments, it was observed that the velocity profiles were linear near the shearing location. Though, as the view shifted towards the center of the bed, the relationship became exponential. The velocity profiles from past experiments will be compared against the relationships found in this conveyor research. If the two relationships differ, this could point towards unexplained velocity phenomena. The application of this research can serve to validate simulations in fluid mechanics and physically demonstrate a process that can be further developed and customized for industry applications, such as feeding a reactor. The image processing can be further developed to process images of non-spherical particles that have a random distribution of size and orientation.

21 Ean Bush, Kourtney Borman, Kamila Krupiarz, Michael Carroll
*MEKK Lift*

Author(s): Ean Bush, Kourtney Borman, Kamila Krupiarz, Michael Carroll
Department: Mechanical Engineering
Faculty Mentor(s): Iman Salehinia, Jenn-Terng Gau
Session Time: 10:15am - 11:30am

Every year since 2005, a team of engineering students at Northern Illinois University (NIU) compete at the annual Society of Automotive Engineers (SAE) Baja intercollegiate design competition with an off-road vehicle. This vehicle is the NIU Baja; designed and built by students. Currently, there is no way to simply transport the vehicle at competition without at least three people to push and steer it. The proposed design project, Mekk Lift, will be an essential tool that permits the Baja vehicle to be lifted and transported by just one person. The Mekk Lift will solve the problem of manually pushing, pulling, or driving the vehicle over grass, dirt, and gravel by mechanically lifting the vehicle off of the ground and driving the lift with a hydraulic motor. In order to successfully create this lift, our team will be responsible for the design, analysis, and fabrication of five major components: chassis, wheels and drivetrain, lifting mechanism, electrical power, and safety. The knowledge gained through our academic experience will be represented through the presentation of this project on Senior Design Day in May 2017.
22 **Andrew Juodis, Peter Gloudeman, Benn Schwartz, Chris Gill**  
*X-Ray Tube Anode Assembly Station*  
Author(s): Andrew Juodis, Peter Gloudeman, Benn Schwartz, Chris Gill  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau  
Session Time: 9:00am - 10:15am

The design of the X-Ray Tube Anode Assembly Station allows for a user friendly and time efficient means of installing an anode assembly into an x-ray tube frame. Richardson Electronics will be able to use utilize the assembly station design for production purposes. The overall assembly process will be accomplished within an hour’s time. This process time includes setting up the frame and anode assembly into the workstation, heating up the frame, inserting the anode assembly, and cooling. Approximate time for heating and expansion of frame is two minutes. After everything is in place, the chamber that surrounds the workstation fixture will be purged of air and replaced with a nitrogen atmosphere. The frame is heated until it can expand and allow sufficient clearance. The frame will then be lowered onto the anode assembly and allowed to cool. To calculate the amount of heat needed, thermal and finite element analysis was performed on the frame. The end goal for this project is to have a reliable and consistent method of installation for these X-ray tube components.

23 **Alex Richardson, Evan Wegehaup, Jacob Suchsland, Nathan Miteff**  
*Smart Spray Bar*  
Author(s): Alex Richardson, Evan Wegehaup, Jacob Suchsland, Nathan Miteff  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau  
Session Time: 11:30am - 12:45pm

Pharmaceutical tablet coating is a technical process that needs precise parameters in order to be done effectively. In order to collect data for these parameters, electrical instrumentation is needed to track the different properties of the coating process. Two extremely important parameters are the spray gun to tablet bed distance as well as the tablet bed temperature. A photoelectric distance sensor, ultrasonic distance sensor, and an infrared temperature sensor are being tested to accurately measure these parameters. Extensive tests have been designed and performed to ensure that the most efficient sensor is chosen for the application. Along with sensor selection and testing, an enclosure for the sensors on the spray bar within the tablet coating machine is necessary. Analysis to predict whether the enclosure will keep the sensors operating under extreme tablet coating conditions will ensure that the product is useful and reliable when released into full production. With the integration of these sensors within the coating machine, the tablet coating process will be made more reliable and efficient.

24 **James Burke, Jonathan Schmid, Robert Labore, William Moran**  
*Sound Based Collision Avoidance in UAVs*  
Author(s): James Burke, Jonathan Schmid, Robert Labore, William Moran  
Department: Mechanical Engineering  
Faculty Mentor(s): Sachit Butail  
Session Time: 9:00am - 10:15am

Many forms of autonomous collision avoidance have been experimented with in the past for unmanned aerial vehicles (UAVs). Obstacle detection and avoidance has typically focused around the concept of using multiple infrared sensors, marker-based motion capture, or GPS. These options are either computationally burdensome and are therefore limited in their capability for detecting and avoiding dynamic obstacles, or can only work outdoors with enough space between obstacles. Drawing inspiration from insect swarms, this project intends to branch away from these methods of obstacle detection and use sound instead. Objectively, the goal is to be able to develop a low-level autonomous collision avoidance system for quadrotors that will use acoustic sensing and recognition as the primary form of detection and avoidance of dynamic obstacles. The sound will be detected by a speaker onboard the quadrotor and processed by the onboard processor of the quadrotor. The project will involve characterization of the sound signals produced by a single quadrotor as it performs different maneuvers, and using the sound signature to develop an efficient sensing and control strategy for another nearby quadrotor. The control algorithm will be first tested in simulation and then implemented on nano-sized quadrotors. Results from this study are expected to enable the implementation of robotic aerial swarms in a variety of environments.
25  **James Schroeder, Ryan Moser, Josh Damler, Brandon Smith, Ryan Billings**  
*Cartoner for 100ct Packing Line*

Author(s): James Schroeder, Ryan Moser, Josh Damler, Brandon Smith, Ryan Billings  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau, Joe Cross  
Session Time: 12:45pm - 2:00pm

This project’s goal was to design and manufacture a 100ct packing line cartoner for IDEAL Industries, Inc. The pre-existing cartoning method was hand cartoning by an operator. Hand cartoning is a tedious and repetitive process, which made it ideal for automation. Automating this process allowed for the operator to be repurposed to a task more suitable of an operator. The cartons are flat with a locking bottom. By pushing on the outside edges of a carton, the carton transitions from a flat state to a three dimensional state as the bottom locks. The carton’s top remained vertical so that the carton can be filled with parts, then later closed. Due to the locking bottom, the flat cartons were thicker at the base than the top. This meant that when attempting to present a stack of flat cartons to a machine, the cartons would shingle. The solution to this problem was to create a radial magazine. The flat cartons create a natural arc due to the non-uniform thickness; therefore, catering to this natural arc made the flat cartons much easier to present to the machine. The process of cartoning the boxes was done using a single pneumatic thruster with a vacuum cup on the end. The thruster would actuate forward and use the vacuum cup to pull the carton forward through a cut out that would force the box to erect as it was pulled through. The carton was then dropped on to a conveyor and sent to the filling machine.

26  **Keith Carey, Scott Izzo, Daniel Pulscher, Dustin Schultz**  
*High Torque Density DC Motor*

Author(s): Keith Carey, Scott Izzo, Daniel Pulscher, Dustin Schultz  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau, Donald Zinger  
Session Time: 9:00am - 10:15am

The goal of electrical motor engineering is to transform an electrical power input into a beneficial mechanical output. Rotational electrical motors are typically formed from a standard design, being a housing, shaft, and stator with coil windings. The electric motor is designed to take electrical power input and then, through the use of the stator and its coils, transmits a magnetic field onto the rotor, which interacts with a magnetic field emitted by the rotor assembly. This magnetic field interaction results in a mechanical torque load onto the rotor shaft which rotates on the constraints of bearings of the housing assembly. This developed torque varies directly with the electrical current component of the electrical input [1]. For industry, it is advantageous and more efficient for a motor to produce a greater torque output for a given power set input. A number of factors can take away from this output, such as friction, stator inefficiencies such as air gap distance between the rotor and stator poles, and internal winding errors or inefficiencies. The functional goal of the High Torque Density DC Motor (HTD-DCM) is to receive an electrical input and convert it into a maximized net torque output through the combined effect of an inner and outer wound stator assemblies. HTD-DCM also aims to compare this torque to a conventional singular stator DC motor for further validation of its improved torque output. HTD-DCM also targets to accomplish this goal at a similar or lower weight, which results in the increased torque density.

27  **Tim Olson, Charles Fortner, Kiley Niemeyer**  
*Pneumatic Control and Manipulator System*

Author(s): Tim Olson  
Department: Mechanical Engineering  
Faculty Mentor(s): Ji-Chul Ryu  
Session Time: 10:15am - 11:30am

The NIU Robotics Club annually enters multiple robots into the Midwest Robotics Design Competition (MRDC). Previous robot designs have included varying attempts at manipulator solutions. The system to be improved was a culmination of three years of research, application, and development. As a team, NIU Robotics wanted to bring the system up to its full potential, by creating custom hardware and control software. The project objective was to research and manufacture components for a general purpose pneumatic manipulator arm. Through hands-on experience, the team members gained an intuitive understanding of dynamic control, fluid dynamics, and kinematics. Prototype grippers were cast and assembled using flexible silicone poured into rapid-prototyped molds. The internal geometry of the
fingers was developed from a design theory started at Harvard University for soft robots. The primary feature of the design is its adaptability to different shapes due to the material’s compliant nature. Custom pneumatic circuitry was developed to utilize available machining capabilities and components. The system is based on proportional solenoid valves to control cylinder positioning through depressurization. The improved circuit is capable of proportionally controlling and isolating four bi-directional pneumatic axes. The series of gripper prototypes showed improvement in reliability and functionality, but require further refinement in both geometry and fabrication technique. The pneumatic manifold increased reliability, stability, and precision of the system, but custom gaskets created large head loss through the manifold. Both avenues of research resulted in improved systems, but require additional research.

28 Collin Wicks, Ramon Valdivia, Luke Lancaster, Samuele Masini

*Automatic Salve Tube Cap Removal*

Author(s): Collin Wicks, Ramon Valdivia, Luke Lancaster, Samuele Masini
Department: Mechanical Engineering
Faculty Mentor(s): Iman Salehinia
Session Time: 9:00am - 10:15am

A pharmaceutical company makes a product that requires them to extract medical grade salve from tubes so that it can be mixed with another salve. Currently, the company has workers manually twist off the caps and put the tubes into an extraction machine. This current method has caused several workers to develop wrist problems and does not allow the company to meet demand. A process was created to automate the removal of the caps from the salve tubes. The main parts of the project consist of a feed system, tooling to hold the tube, a blade system to cut the cap off once it is inserted into the holder, a system to move the tube to the machine that extracts the salve, and sensors and actuators controlled by a microcontroller. The feed system was designed to be able to be loaded with twenty four tubes and feed one tube at a time into the tube holder. The tube holder was designed to hold the body of a tube firmly so that the cap can be cut without salve being squeezed out. The cutting process utilizing a blade being driven by an actuator was created based off of finite element analysis of the interaction of a blade tip and the tube. An assembly using two linear actuators was designed to move the tube holder over and feed the tube up into the extraction machine. The automation of this process will increase the production rate and eliminate problematic ergonomic conditions for workers.

29 Juan Mendez, Ramadan Matariyeh, Jose Chavez, Blake Wuestenfeld, Jerry Galeana

*Hydrodynamic Advantages of Fish Schooling*

Author(s): Juan Mendez
Department: Mechanical Engineering
Faculty Mentor(s): Sachit Bhatia
Session Time: 11:30am - 12:45pm

To engineers, fish are an inspiration for the design of efficient underwater vehicles. In the past, fish locomotion has been studied in detail using advanced visualization methods to uncover the hydrodynamics that may be responsible for efficient swimming. Such studies have inspired the design of robotic underwater vehicles that consist of undulated caudal fins, much in the form of a fish. Moving forward, coordinated groups of fish called schools have become the inspiration for the design of an underwater robotic school that can be used for environmental sensing and monitoring. However, the role of hydrodynamic advantage in schooling behavior, and its dependence on school size and shape are not well understood. A first step in this direction is to design an experimental setup that can simulate the freshwater environment for schooling fish. This project aims to design and build an experimental setup to quantify the dynamics of fish schooling behavior. The experiment will include the construction of a swim tunnel simulate flow of a traveling school of fish. Patterns of different artificial fish schools will be lowered into the tank that will create resistances and disturb the streamline flow throughout the water. A single artificial fish attached to a Load Cell will be lowered into the water to interact with the water disturbed by the school. This will give Data on the distributed forces around a school of fish allowing for the most desired locations to swim would be.
30  Jonathon Czaruk, Aaron Lewis, Alexis Massman, Maninderjit Singh  
Assisted Lifting Brace  

Author(s): Jonathon Czaruk  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau  
Session Time: 9:00am - 10:15am  

Although the human body is very complex, everyday materials can be manipulated to replicate natural motion. Artificial muscle fibers, for example, are manufactured by tightly winding monofilament fishing line. Due to the unique properties of polymers, the artificial muscle fibers contract when thermally actuated. This behavior mimics the functionality of natural skeletal muscle. Due to the infancy of artificial muscle fiber technology, their implementation in electro-mechanical design has been scarce. The absence has provided an opportunity to explore the feasibility of harnessing fiber actuation in a practical application; a lift-assist mechanism. The Assisted Lifting Brace is fastened to the arm and generates torque around the elbow to provide support during lifting. Artificial fiber actuation is activated when an sEMG sensor detects the operators natural muscle contraction. An Arduino Uno processes the incoming signal and immediately transmits current to the fiber heating coils. As the fibers contract, the linear motion is captured and controlled by the Assisted Lifting Brace Compression Cartridge. The linear force generated during actuation is converted to rotational movement. The torque created supports operator movement throughout the lift. Design practicality was measured by product performance, efficiency, and durability.

31  Robert Morris, Kevin Delahanty, Charles Gudbrandsen, Dan Calabrese, Dirk Miers  
3D-Printer Filament Recycler  

Author(s): Robert Morris, Kevin Delahanty, Charles Gudbrandsen, Dan Calabrese, Dirk Miers  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau, Federico Sciammarella  
Session Time: 10:15am - 11:30am  

This project, designing and prototyping a 3D Printer Filament Recycler, seeks to minimize waste material from fused deposition modeling 3D printing processes by allowing for the recycling of failed or undesired plastic prints at the hobbyist level. By utilizing an industrial shredder to granulate plastic pieces into pieces that are then loaded into a heated extruder, the recycler can then re-extrude new filament with similar properties to vendor-purchased product to allow for the production of new prints. With built-in quality control mechanisms and Arduino-based temperature, torque, and selection controls, this project seeks to be an all-in-one solution to conventional plastic recycling without the need for multiple machines or outside facilities.

32  Matt Irngang, Andrew Meeks, Andrew Saavedra, Kyle Berkhof  
Stationary to Mobile Pallet  

Author(s): Matt Irngang, Andrew Meeks, Andrew Saavedra, Kyle Berkhof  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau  
Session Time: 11:30am - 12:45pm  

For our Senior Design project, we were tasked with creating a mechanism that would allow a stationary shipping pallet to be moved around without the need for a forklift or pallet jack. Our client, Vertigo in DeKalb, often needs to ship heavy products on shipping pallets to customers that are not usually equipped to unload them or replace them. Our goal was to design a mechanism that would be able to lift and support the weight required and be easy to install and operate without interfering with forklift operation.
33 Ryan Rogers, Brandon Paul, John Calderon

*Human Centric Building Control System*

Author(s): Ryan Rogers  
Department: Technology  
Faculty Mentor(s): Kevin Martin, William Mills  
Session Time: 12:45pm - 2:00pm

The Human Centric Building Control System focuses on converging separated networks such as lighting, Indoor Air Quality Modification (IAQM), security, Wi-Fi, and CCTV through power over Ethernet (PoE) with emphasis on human factors. This allows the ability to string data along with sufficient power through a single port. Current PoE systems can produce up to 25.5W of power, but future systems plan on delivering up to 60W of power. By adapting the current spectral lighting setup, we will be expanding the network by adding an IAQM Unit. The finished project will help industry become more efficient and help employees become more productive.

34 Carl Kerschner, Damian Almaraz, Daniel Krupa, Andrew Yoggerst

*Autonomous Defect Rejection System*

Author(s): Carl Kerschner, Damian Almaraz, Daniel Krupa, Andrew Yoggerst  
Department: Mechanical Engineering  
Faculty Mentor(s): Ji-Chul Ryu  
Session Time: 9:00am - 10:15am

Cascades Enviropac in Aurora is a paper conversion plant producing fiber and corrugated cardboard partitions, mainly for the bottling industry. In their fiber production lines the 2nd or 3rd stages often produces damaged products near the end of a production run. These damaged partitions cause jams in the end stage collapser, which requires the whole line be stopped to correct. These jams may be prevented by removing faulty partitions from the line between the 2nd and 3rd stages, increasing line up time, productivity and gross revenue potential. This project sought to detect these defective partitions using a series of photoelectric sensors inputting quality data to a micro controller, which would then trigger a pneumatic valve to send a pulse of compressed air to eject the defective part from the conveyor belt between the two stages. A study is also being conducted for a fail safe series of high voltage electrical relay switches to automatically stop the line in the early phase of a jam, if a defective partition bypasses the early detection stage.

35 Colin Narug

*Biaxial Tensile Test Machine Prototype*

Author(s): Colin Narug  
Department: Mechanical Engineering  
Faculty Mentor(s): Jenn-Terng Gau  
Session Time: 9:00am - 10:15am

The project that was being performed was the Construction of Biaxial Tensile Test Machine Prototype. A biaxial tensile test machine is a device used for obtaining the material properties of a sample through pulling on it in four different planer directions. By measuring elongation and the force exerted in each direction on the sample, it is possible to gain a better understanding of how the material will behave in realistic situations such as when it is bent or machined. While there are machines that exist on the market that can do these tests, The type of material being tested at Northern Illinois University require specialized equipment. The materials tested are often only a few microns thick so precise alignment and a slower testing speed are needed to ensure that only planer forces are applied the sample and to ensure enough time for data to be collected. Taking these factors into account a prototype biaxial tensile test machine was designed and assembled.
36 Nick Ploessl, Nick DeStefano, Cal Stewart

EZ-Lift

Author(s): Nick Ploessl, Nick DeStefano, Cal Stewart
Department: Technology
Faculty Mentor(s): Robert Tatara
Session Time: 12:45pm - 2:00pm

PROJECT SUMMARY: Lifting heavy loads can be strenuous on a person and harmful to one’s health. In fact, OSHA states that any load over 50lbs can seriously increase the risk of injury, therefore, mechanical assistance should be used. The scissor lift design was chosen because of its ease of use, and having numerous applications. The EZ-Lift will raise and lower loads for personnel thus increasing efficiency and lowering the risk for injury. The EZ-Lift will be a portable cart that allows the user to move a product from working height from one location, down to a lower center of gravity while transferring, than back up to working height at the new location. Conventional lifts use hydraulics to raise the platform but our lift will utilize a linear actuator to achieve motion. The theory for our actuator placement is one hundred percent completed. The actuator will be placed near horizontal at a specific angle so that the 2000lb force applied horizontally can achieve lift of the 400lb target load vertically. Our lift will be constructed of ASTM A36 common steel based on its mechanical properties and cost. DESIGN OBJECTIVES: Competitive pricing with a price point below $1000; Lift capacity of 400lbs; Powered by linear actuator; Portability – able to be maneuvered by one person; Run off of 120-VAC / 12V battery pack; Under 20-amp draw.

37 Kyle Unto, Anthony Petrouski, Richard Tasa, Michael Holumn

Zero Gravity Exercise Device

Author(s): Kyle Unto, Anthony Petrouski, Michael Holumn, Richard Tasa
Department: Mechanical Engineering
Faculty Mentor(s): Iman Salehinia, Anthony Deldin, Peter Chomentowski
Session Time: 9:00am - 10:15am

Since man has been exploring the boundaries past earth different problems have arisen involving the human body. Early on, it became known that the longer a person is in a zero gravity environment the more the astronauts unused muscles will atrophy. NASA has implemented new plans to have manned mars missions. In its second phase of the mission, the Orion spacecraft will take an eight-month journey to Mars with six astronauts traveling through deep space. Due to a prolonged weightlessness environment, the human body must meet the physical demands to prevent muscle atrophy and bone density loss. Several different devices have been implemented to get the astronauts to move the many different parts of their bodies. A previous exercise machine ARED (Advanced Resistive Exercise Device) has only compensated very little to alleviate the problems. A study has shown where significant losses in muscle strength and bone density are the result from a weightless environment comparable to bedridden patients on Earth. A decrease in performance loss could affect the crewmembers’ ability to perform specific tasks and increases the risk of health problems. The biggest concerns are space and power usage. The device that we are designing to looking to meet these challenges. The Zero Gravity Exercise Device has been developed to increase the number of available exercises and provide a higher weight resistance. Eight exercise groups are implemented in fulfilling the exercise regimen: horizontal pushing and pulling, vertical pushing and pulling, quad dominant, hip and hamstring dominant, and elbow flexion and extension. This method allows for a wider range of exercises for a full-body work out.

38 David Sopoci, Alec Brown, Edwin Martinez

NIU Split-Hopkinson Pressure Bar (NIU-SHPB)

Author(s): David Sopoci, Alec Brown, Edwin Martinez
Department: Mechanical Engineering
Faculty Mentor(s): Jenn-Terng Gau
Session Time: 10:15am - 11:30am

The Split-Hopkinson Pressure Bar is a testing apparatus to be used by Northern Illinois University and its associates. This type of apparatus is used to gain knowledge of the material properties of a test specimen. The SHPB allows tests to be run in order to look at a material’s dynamic strain under compression. The tests are run from a computer interface, and data is collected, including high-speed imaging of the test specimen and a graph of the strain wave transferred. The SHPB works by launching a projectile bar into a long bar mounted with a strain gauge known as the incident bar. The strain wave is shown in the data collected by the strain gauge. This wave is split when it reaches the specimen, which is
mounted between the incident bar and a second long bar called the transmitted bar. There is a strain gauge on the transmitted bar which shows the part of the wave which is transmitted, and the strain gauge on the incident bar shows the wave which reflects back. During this time, the high-speed and thermal camera will capture the impact of the incident bar and the specimen. This data is used to show how different materials respond to near instantaneous compression.

39  Zach Prosser, Willis Sakyi, Carl Tomczak  
*Frantz Manufacturing Semi-Automated Packaging System*

Author(s): Zach Prosser  
Department: Technology  
Faculty Mentor(s): Shun Takai  
Session Time: 12:45pm - 2:00pm

FRANTZ Manufacturing Company is a manufacturer of conveyor system components. They initiated this project with the Technology department because they want to reduce the downtime on one of their ball bearing production lines. We have been tasked with designing a semi-automated packaging system that will eliminate the five minutes of downtime created between the time when the operator shuts down the machine to manually place cartons onto a pallet and when he starts it up again. We have observed the current production process in person and have identified all the causes of the downtime and possible ways to eliminate them by automating various parts of the process. Specifically, automating the movement of each box from the conveyor to the pallet. Our design is required to stay within the size of the available floor space by the machine and not exceed the implementation budget of $10,000. Through our research of automated packaging systems utilized by FRANTZ and other manufacturing companies, we will ensure that our design meets all safety and ethical standards.

40  Priyal Shah, Catherine Lashley-Lanford  
*Effects of Caring for the Elderly: A Tri-County Study*

Author(s): Priyal Shah, Catherine Lashley-Lanford  
Department: Family, Consumer and Nutrition Sciences  
Faculty Mentor(s): Susan Bowers  
Session Time: 9:00am - 10:15am

In this study, we examined models of caregiving for the elderly in a tri-county region. The three counties investigated were DeKalb, Ogle, and Lee Counties in Illinois. The aim of the study was to look at factors related to the ability to age in place. For those without dementia, research suggests the availability of a caregiver is a significant factor in their ability to age in place (e.g., not be admitted to long-term care) (Andel, Hyer & Temple, 2007). To date, little is known about caregiving locally, including stressors and rewards for the caregiver. This study aimed to fill that gap by using an interview method with caregivers.

41  Isabella Johnson  
*Examining Support Needs of Postsecondary Students with Autism Spectrum Disorder*

Author(s): Isabella Johnson  
Department: Allied Health and Communicative Disorders  
Faculty Mentor(s): Bryan Dallas  
Session Time: 10:15am - 11:30am

Perceptions of postsecondary students with Autism Spectrum Disorder regarding family member support after enrollment in classes was investigated, along with academic accommodations. Current postsecondary students with Autism Spectrum Disorder in the Northern Illinois area were surveyed. Roles that postsecondary students with Autism Spectrum Disorder think their family members should fulfill or not fulfill, roles they think are beneficial for success, roles that their family members currently provide are examined. Current accommodations provided by their school and accommodations they wish that their school could provide are also examined.
42 Lauren Miller  
*The Promotion of Print Awareness During Mother-Infant Shared Book Reading.*  
Author(s): Lauren Miller  
Department: Allied Health and Communicative Disorders  
Faculty Mentor(s): Janet Olson  
Session Time: 11:30am - 12:45pm  

This study investigated the question: How do mothers promote print awareness during shared book reading at 17 and 21 months? This is important to consider because early print awareness skills are positively associated with children’s early written language skills even though very little is known about how mothers share books with their infants and how that might change overtime. Therefore, the current study utilized an existing longitudinal sample of 12 mothers sharing books with their infants at 17 and 21 months. The Mother Infant Print Awareness Checklist, a modification of the Parent-Child Reading Behavior Checklist and the Toddler Emergent Literacy Checklist was used to measure mothers’ references to print such as pointing out letter names, highlighting punctuation, contrasting print from pictures, and identifying titles (Frome Loeb, et al., 2016; Scott el al., 2016). Results showed that print referencing occurred infrequently at 17 and 21 months of age. However, it was found that mothers labeled pictures more often than they, described pictures, asked questions, read the print, made animal noises, and related the book to their infants’ knowledge. The frequency of these behaviors did not vary by age and these behaviors were not significantly related to infants’ expressive or receptive vocabulary sizes at 17 months.

43 Emily Knetsch  
*The Effects of Maternal Positioning and Touch on Infant’s Shared Book Reading*  
Author(s): Emily Knetsch  
Department: Allied Health and Communicative Disorders  
Faculty Mentor(s): Janet Olson  
Session Time: 12:45pm - 2:00pm  

The current study examines the effects of maternal positioning and touch on 17-month-olds attending during shared book reading. Previous studies have examined the effects of maternal language during shared book reading and preschoolers’ vocabulary sizes (e.g., Dunst et al., 2012; Landry et al., 2011). In addition, attention during book sharing has also been positively related to children’s language outcomes (Fletcher & Reese, 2004). However, few studies have examined how mothers use positioning and touch to influence the shared book reading environment. An existing dataset of shared book reading was used to code two variables: positioning and maternal touch along with the amount of time infants attended during book sharing. Dyads’ positions were coded as Dependent, Independent, Mobile and Other. Maternal touch was categorized as Corrective or Non-corrective touch. Infants spent more time in the dependent position which was positively correlated with time attending. Inversely, time in the mobile position was negatively correlated with time attending. Non-corrective touch was positively correlated with total time attending during the book sharing experience.

44 Danielle Dwyer  
*Comparison of supplement use between athletes and non-athletes at a Midwestern University*  
Author(s): Danielle Dwyer  
Department: Family, Consumer and Nutrition Sciences  
Faculty Mentor(s): Priyanka Ghosh Roy  
Session Time: 9:00am - 10:15am  

This study examines the similarities and differences between nutrition supplement use in college students (athletes vs. non-athletes). Data is collected via a ten question in-person survey, which takes into account different factors of each student, such as: age, major, dietary and physical activity behavior, source of knowledge, and intended use of supplement. The purpose is to examine trends between certain nutrition supplements and the college students who use them. The data shows that athletes not only consume different supplements than non-athletes, but also shows the difference between the level of nutrition education between the two groups. Future studies may use this data to examine deeper issues regarding nutrition education in college students. More so, health professionals may use this data to increase success in collegiate athletics programs, and/or to provide proper nutrition education about popular nutrition supplements to the general college population.
Loretta Sanders
Handbook for Officers - How to keep your soldiers combat ready through exercise, nutritional, emotional, and preventive care.

Author(s): Loretta Sanders
Department: Nursing and Health Studies
Faculty Mentor(s): Laura Beamer, LTC Jerome Morrison
Session Time: 10:15am - 11:30am

Abstract
Background: Serving in the military is physically and mentally demanding. Soldiers must carry heavy equipment and move in positions that cause stress on joints. The knee is the most common site of injury among military personnel. The military relies on soldiers remaining combat ready to ensure the safety of the United States.
Purpose: The purpose of this project was to develop a resource handbook focusing on prevention and management of military-associated knee injuries. Officers with an injured soldier are the intended end users of the handbook.
Methods: Interviews were conducted among military healthcare providers including a physician, nurse practitioner, physical therapist. The scientific literature focusing on military knee injuries was systematically explored to identify evidence for best clinical practice.
Results: Data collected from the military healthcare provider interviews and the scientific literature was synthesized to create an evidence-based handbook on knee injury prevention and management.
Discussion: The next steps for the handbook are to publish it and share it with new Officers. Start with distributing to my fellow cadets who commission this May 2017 into the U.S. Army as 2nd LT.

Megan Haduch
Effects of an Art Program on Language Expression in Dementia

Author(s): Megan Haduch
Department: Allied Health and Communicative Disorders
Faculty Mentor(s): Jamie Mayer
Session Time: 11:30am - 12:45pm

Art therapy is a method of cognitive stimulation that has been found to produce positive health outcomes for individuals with dementia. The process of creating art capitalizes on areas of the brain that are often spared until late in the disease process; moreover, the errorless nature of free-form art creation additionally encourages independence, self-control, and self-worth - i.e., cognitive self-efficacy, which has been shown to critically predict functional outcomes. Despite the solid rationale for including arts programs in standard dementia care, there are few evidence-based guidelines that exist. We have designed a structured, communications-based arts program, Positive Activity, intentional expressions (PAINT) based on the Memories in the Making protocol from the Alzheimer’s Association and pilot data from our lab. As part of a larger study, this project involved observing the impact of program participation on language and communication for participants (three individuals with mild to moderate dementia). Language samples have been collected from program participants at three baseline sessions, during each PAINT session (x 8 weeks), and at two follow-up points. These have been transcribed and are in the process of being analyzed using Systematic Analysis of Language Transcripts (SALT) to examine if and how language (e.g., number of ideas produced) improves with regular program participation.

Zachary Kalk
Exploring the Knowledge, Attitude, and Beliefs About Human Sexuality

Author(s): Zachary Kalk
Department: Educational Leadership
Faculty Mentor(s): William McCoy
Session Time: 12:45pm - 2:00pm

The purpose of this research is to further the knowledge of human sexuality. Specifically, the research will discover how males learn about masturbation. Although this researcher recognizes that females indulge in masturbation, this research will specifically look at males. The primary objective of the research is to understand how male college students are taught about masturbation in single parent homes where the female is the head of the household. We expect the research to yield a variety of ways males learn how to masturbate.
In recent years, there has been an increase in ambiguity regarding romantic relationship formation (Stanley, Rhoades, & Fincham, 2011), and a decrease in clear signals to clarify intentions of commitment in couple relationships (Stanley, Rhoades, & Whitton, 2010). There has been a recent trend in emerging adult (18-29 years old) relationships called “just talking”. Through the steps of qualitative analysis 13 unique themes (prior relationship experiences, personal insecurity, avoidance of emotional pain, proceed with caution, formation of a safe zone, provides time to build confidence, afraid of losing options, experimenting romantic compatibility, freedom to compare potential partners, comfort in not committing, differing degrees of investment, unable to reciprocate expectations, and expectations can change over time) were identified regarding the relationship concept of “just talking”. Through the themes that emerged, we found that the “just talking” pathway to relationship formation in emerging adults is heavily rooted in ambivalence, confusion, and the use of technology. This study has important implications for educators, researchers and clinicians that work with the emerging adult population.

One of the leading causes of death among children under 5 in the world is diarrhea. This is true for Madagascar having 5,840 deaths each year, where approximately 80% of the population (22.9 million) lives below the poverty line. This study evaluated the social determinates and environmental factors that affect child health of a remote village in Madagascar. Household surveys (n = 60) were conducted to obtain demographic, living environment, lifestyle, and health information in the summer of 2016. This survey showed that 25% of children under 5 had watery stool more than three times a day, which is defined as diarrhea, in the past two weeks. This suggests that every child might have diarrhea over 5 times every year. The main source of drinking water is an unprotected spring, which is an unsafe source. All survey participated houses use pit latrine, and do not have access to approved sanitation. This result was inconsistent with the national statistics that show 50% of the population has access to improved source of drinking water and 14% improved sanitation facilities. 20% of mothers with children under five did not always wash their hands with soap after defecation. Although this study didn't show a statistical significance due to a small sample size, previous studies suggest that children are five times more likely develop diarrhea because of the mother's poor hygiene practice. Further collaborative efforts among local community, government, NGOs, and academia will be needed in order to protect and promote children's health.

Autism spectrum disorder (ASD) is a neurodevelopmental disorder affecting approximately 1 in 68 children. Research shows that children with ASD have greater difficulty performing motor tasks compared to their neurotypical peers. The focus of this study was to investigate the relationship between severity of ASD symptoms in children and motor skills through the administration of multiple assessments; daily living skills were also assessed. A statistically significant inverse relationship was found between the SRS (autism symptom severity survey) and Movement ABC-2 overall standard score (rs = -0.536, p = 0.039). The same relationship was found for the following BOT-2 scores: upper limb coordination (rs = -0.695, p = 0.026), body coordination (rs = -0.681, p = 0.030), balance (rs = -0.677, p = 0.032), and overall gross motor score (rs = -0.636, p = 0.048). A negative correlation also existed between the SRS and Vineland
receptive skills \( (rs = -0.799, \ p = 0.006) \), expressive skills \( (rs = -0.914, \ p = 0.000) \), overall communication domain \( (rs = -0.760, \ p = 0.011) \), personal daily living skills \( (rs = -0.865, \ p = 0.001) \), all socialization domain scores \( (rs = -0.798, \ p = 0.006) \), interpersonal skills \( (rs = -0.847, \ p = 0.002) \), play and leisure \( (rs = -0.701, \ p = 0.024) \), coping skills \( (rs = -0.755, \ p = 0.012) \) and overall motor domain \( (rs = -0.885, \ p = 0.002) \). These results offer insight on the importance of developing treatment plans that emphasize the utilization of physical and occupational therapy for motor, social, and daily activities.

51 Lezlie Williams

Assessing Food Insecurity at NIU

Author(s): Lexie Williams
Department: Nursing and Health Studies
Faculty Mentor(s): Kristen Borre, Courtney Gallaher
Session Time: 12:45pm - 2:00pm

Food insecurity at the college and university-level is an issue that has been largely overlooked. Until recently, Northern Illinois University was only able to provide support to students who were experiencing a food crisis on a case-by-case basis, as the student expressed their need. The Huskie Food Pantry is the university’s proactive attempt to keep students from reaching this crisis point. Two very recent studies assessed the food security status of undergraduate students. These studies found significant correlations between food insecurity and GPA, financial support level, race, and employment status. The food-insecure students reported that hunger or housing problems had an impact on their education, specifically not buying required textbooks, missing classes, or dropping classes. The research questions that we aim to answer are: What does a food insecure student at NIU look like (demographic profile)? How many food insecure students are there at NIU, and to what severity is the food insecurity? What are the students’ coping strategies, and why? We plan to utilize Qualtrics to formulate, disseminate, and analyze our survey. We will use questions that assess the severity of food insecurity, kinds of foods needed, residence status, level of income, coping strategies such as SNAP, and availability (compared to the times that the Huskie Food Pantry is operational). Our expected results are that many students who are food insecure are not utilizing DeKalb County resources such as the Huskie Food Pantry and other area food pantries. We also expect to find that, based on the aforementioned studies, there is an increased need for food security in minority populations. We will be using the results to review current procedures and resources. This will help us determine if we are matching the needs of the students and, if not, how to improve pantry operations.

52 Emili Mikołajczyk

Investigating the Disparity of Employment Opportunities of Individuals with Disabilities

Author(s): Emili Mikołajczyk
Department: Health Sciences
Faculty Mentor(s): Matthew Sprog
Session Time: 9:00am - 10:15am

This study examines Human Resource Managers (HRM) involved in the hiring process and the idea of disability discrimination while looking at a resume of an individual with a disability. HRM will receive a job description, an applicant resume (either male or female), and an interview summary and they must determine whether or not they would hire the individual. After deciding, participants will complete a survey asking them how qualified they felt the applicant was for the job, the potential starting pay for this individual, and personal questions such as their knowledge of the Americans with Disabilities Act (ADA). The experiment will attempt to prove that there is a discrimination towards individuals with disabilities in the workplace and a lack of knowledge of the ADA. Another aspect being observed at is the idea of Double Jeopardy, if being disabled and a female will lessen the chances of you getting hired for the position. After completing this study, we hope to close the gap between disabled and nondisabled people that are getting hired and raise awareness of the act that is in place to keep discrimination out of the hiring process, as well as the idea of gender bias in the workplace.
53  Agape Montero
Nursing Stress Management Strategies

Author(s): Agape Montero
Department: Nursing and Health Studies
Faculty Mentor(s): Jie Chen
Session Time: 11:30am - 12:45pm

Background: Workplace stress, burnout and job dissatisfaction are common topics that affect the wellbeing of nurses. Many studies go into the discovery of nursing stress factors but fewer studies have looked into ways to manage this stress.

Aim: The aim of this review was to evaluate current intervention strategies to manage nurses’ work stress effectively.

Methods: The search strategy involved usage of the following databases: CINAHL (Cumulative Index to Nursing and Allied Health). Keywords for literature search were nurse, stress, management, burnout, coping and clinical supervision. Articles reviewed were published between 2014-2016 with studies regarding the effectiveness of stress management strategies on all types of nurses conducted in various countries and reported in English.

Results: Programs and interventions, allowing nurses to take time away from work either to relax, converse about their jobs or simply talk to someone about their mental and physical health is a concept that many hospitals are currently trying to implement. Another idea is emphasizing the importance of strong management within the administration of the organization or hospital to improve the relationships and communication between the nurses and the higher management. Individual coping helps nurses take it upon themselves to manage their stress. A new concept is one that involves the addition of clinical supervision amongst nurses, where a more experienced professional aids a less experienced one.

Conclusions: Through these various management strategies, the goal is that they will provide support and confidence to the nurses as well as help them manage their workplace stress.

54  Jessica Gall
Pelvis and Perineum Dissection

Author(s): Jessica Gall
Department: Biological Sciences
Faculty Mentor(s): Daniel Olson
Session Time: 9:00am - 10:15am

The purpose of this pelvis and perineum dissection is to study a region of the body that is commonly overlooked in anatomy labs and to gain an in-depth knowledge of this area of the body. The expected results for this project are to make several original diagrams and thoroughly explain each structure of the pelvic region. This area of the body makes this project unique because it is one of the most difficult areas to dissect. The pelvic region has been reported to not have been focused on heavily during anatomy lectures and labs, so this research will serve as a way to fill this gap in the department.

55  Marilyn Chakkalamuri
Targeting GLI in T-cell Lymphoma

Author(s): Marilyn Chakkalamuri, Naomi Nakajima, Jason Misurelli, Sherine Elsawa
Department: Biological Sciences
Faculty Mentor(s): Sherine Elsawa
Session Time: 10:15am - 11:30am

Approximately every 9 minutes, a person in the United States dies from a blood cancer. Of these, lymphoma is the most common. Lymphoma occurs with the abnormal growth of white blood cells- called lymphocytes- and is a very aggressive form of cancer. This project focused on T-cell lymphoma (TCL). The two main types of TCL are: cutaneous T-cell lymphoma (CTCL), which originates and manifests on the skin, and peripheral T-cell lymphoma (PTCL) which develops within white blood cells and manifests itself in lymph nodes. The hedgehog (HH) signaling pathway plays an important role in normal development and oncogenesis. GLI transcription factors (GLI1-3) mediate HH signaling. Previous studies have investigated the role of GLI1 in TCL. However, to date, no studies have investigated the role of GLI2 or GLI3 in TCL. The goal of this project was to investigate targeting GLI either alone or in combination with other TCL therapies on TCL growth. We hypothesize that combined targeting of GLI with standard therapies for TCL will enhance therapeutic outcome. We examined the effect of inhibition of GLI via HH signaling through the smoothened
(SMO) receptor using Cyclophosphamide or directly targeting GLI using the GLI antagonist (GANT61)- alone or with Bortezomib, Ibrutinib, Panobinostat (LBH589) or Romidepsin- on TCL growth using an XTT Proliferation assay. Inhibition of HH using Cyclophosphamide had no effect on TCL cell growth. However, inhibition of GLI significantly reduced TCL growth. Romidepsin treatment also significantly reduced cell proliferation. However, combined targeting of GLI with other therapies including Romidepsin did not enhance GLI-mediated reduction in cell growth at the concentrations used. GLI inhibition and Romidepsin inhibit TCL growth. Current experiments are aimed at investigating the effect of different doses of GANT61 and Romidepsin and targeting GLI using RNAi and examining the effect on TCL growth in combination with other therapies.

56 Brandon Sklavanitis

Generation of conditional knockout mice lacking GLI3 expression in monocytes

Author(s): Brandon Sklavanitis, Sherine Elsawa, Stephan Matissek
Department: Biological Sciences
Faculty Mentor(s): Sherine Elsawa
Session Time: 11:30am - 12:45pm

GLI3 is a zinc-finger transcription factor regulated by the Hedgehog (HH) signaling pathway. Most studies on the role of GLI3 have shown it to be important in development where mice lacking GLI3 have several developmental abnormalities. In preliminary experiments, an induction of GLI3 expression is observed, in monocytes, in response to LPS/TLR4 stimulation. This occurred independent of HH signaling as pretreatment of monocytes with the HH inhibitor cyclophosphamide had no effect on LPS induced GLI3 expression. Both TLR4 signaling and GLI3 induce the expression of a similar set of inflammatory cytokines suggesting GLI3 may mediate LPS-induced inflammation. To address this, we are using the Cre-loxP recombination system to knock out GLI3 in monocytes. We are crossing GLI3-floxed mice with LysM-Cre mice to generate GLI3 gene knockouts in monocytes. Cre-loxP recombination requires each cell to contain two copies of the loxP allele and one copy of the Cre recombinase. LoxP sites contain two palindromic sequences with a central core. The palindromic sequences allow complementary base pairing between two loxP sites. In this experiment, loxP sites flank exon 8 containing the gene for Glil3 expression. Monocyte specific knockouts are created because Cre transcription is regulated by a lysozyme promoter sequence upstream of the gene. When Cre is expressed, it induces recombination events between two loxP sites. The outcome is either gene silencing by deletion or inversion of the DNA sequence. In mice where GLI3 knockout is achieved, we will challenge mice with LPS and examine the requirement for GLI3 in LPS-induced inflammation.

57 Gabriela Ibarra

Targeting GLI3 in Diffuse Large B-cell Lymphoma

Author(s): Gabriela Ibarra, Weiguo Han, Sherine Elsawa
Department: Biological Sciences
Faculty Mentor(s): Sherine Elsawa
Session Time: 12:45pm - 2:00pm

Diffuse large B-cell lymphoma (DLBCL) is an aggressive lymphoma that is further subdivided into activated B cell (ABC) and germinal center B cell (GCB) like subtypes. Each subtype responds to therapy in different ways and the association of many signaling pathways is important in understanding tumor formation and ultimately helping in the prevention of cancer development. GLI proteins, which are members of the hedgehog (HH) signaling pathway, are important transcription factors because they regulate target gene expression by directly binding to specific sequences (binding sites) in the corresponding promoter regions. We investigated GLI1-3 expression by qPCR in 12 DLBCL cell lines belonging to ABC and GCB subtypes. An increase in GLI3 expression in the GCB subtype was observed, but that did not reach statistical significance, possibly due to the small sample size. Therefore, publically available data published on Gene Expression Omnibus (GSE10846) was used to analyze the expression of GLI1, GLI2 and GLI3 in the DLBCL subtypes. We found an increase in GLI2 and GLI3 expression in GCB DLBCL compared with ABC DLBCL. The role of GLI1 and 2 have been studied in DLBCL, however, no studies have investigated the role of GLI3. We therefore targeted GLI3 in GCB DLBCL using RNA interference and found a decrease in cell proliferation corresponding to a reduction in GLI3 mRNA expression. Taken together, these studies show that GLI3 mRNA is elevated in GCB DLBCL patients and its knockdown reduces cell growth.
58 Sarah Entwistle
Comparative Genomic Analysis of Talaromyces Verruculosus

Author(s): Sarah Entwistle, Yanbin Yin
Department: Biological Sciences
Faculty Mentor(s): Yanbin Yin
Session Time: 9:00am - 10:15am

Talaromyces verruculosus is a lignocellulosic degrading fungi found primarily on tobacco plants. A comparative genomic analysis of Talaromyces verruculosus, other Talaromyces species, and related Penicillium species may give further insight into what controls this enzymatic degradation process. Using computational methods to compare phylogenetic relationships and genomic sequence features such as families of carbohydrate-active enzymes and horizontally transferred genes can help identify features worthy of further investigation.

59 Jonathan Dixit
Characterization of the transcription factor gene hbx1 in Aspergillus nidulans

Author(s): Jonathan Dixit, Sandesh Pandit
Department: Biological Sciences
Faculty Mentor(s): Ana Calvo
Session Time: 10:15am - 11:30am

Aspergillus nidulans is a model organism phylogenetically related to the important human and plant pathogens, Aspergillus fumigatus and Aspergillus flavus. In A. flavus, the transcription factor gene hbx1 has been shown to regulate the production of asexual spores or conidia, formation of sclerotia (resistant structures) and secondary metabolism, including the production of the carcinogenic compound aflatoxin. Besides the A. flavus study, the role and mechanism of action of hbx1 homologs in other fungi is unknown. For this reason, we will further study the hbx1 homolog in A. nidulans. We will generate a deletion, complementation and over expression hbx1 strains to elucidate hbx1 regulatory scope, as well as a strain containing hbxA fused to green fluorescent protein to examine Hbx1 subcellular localization in the model fungus.

60 Amy Daly
Trial Remediation of the Hyperalkaline Calumet Wetlands

Author(s): Amy Daly, Karel Waska
Department: Biological Sciences
Faculty Mentor(s): Wesley Swingley, Melissa Lenczewski
Session Time: 11:30am - 12:45pm

Located at the southern tip of Lake Michigan, the Calumet Wetlands is a historical steel slag dumping site. With a pH > 13.2, it is the most alkaline environment measured on Earth. As this site is in the middle of a populous area in Chicago, it is the target of an upcoming Chicago Park District reclamation effort. Remediation of the contaminated water is an essential part of this initiative. This research aims to analyze the effects of permeable reactive barriers, using dolomite, quartz, and Apatite II on remediating Calumet pH and geochemical contaminants. Samples from the hyperalkaline sediment and within the barrier were analyzed for microbial diversity both before and after trial remediation. Analyses of these microbial communities and their impact on local geochemistry is critical for understanding present and future biogeochemical processes at this and other hazardous waste sites as they undergo reclamation and remediation.

61 Peyton Whiston
Quantifying the Ecosystem Services of Dung Beetles in a Restored Tallgrass Prairie

Author(s): Peyton Whiston
Department: Biological Sciences
Faculty Mentor(s): Holly Jones, Nick Barber
Session Time: 12:45pm - 2:00pm

Humans are highly dependent upon functional ecosystems for a wide variety of goods and services, known as ecosystem services. Through the decomposition of dung, dung beetles provide an ecosystem service valued at US$380 million per year in the United States. The decomposition of dung also aids in the cycling of nutrients, dispersal of seeds,
and control of parasites in tallgrass prairies. The tallgrass prairies of North America are among the most threatened ecosystems in the world. The reinstatement of disturbance regimes, including bison grazing, are a key facet in the active management of restored and remnant tallgrass prairies, and the effects of these disturbances on both flora and fauna have been well studied. However, the effect of bison grazing and time since restoration on the ecosystem service of dung decomposition has not been studied in tallgrass prairies. At Nachusa Grasslands in Franklin Grove, Illinois, we studied dung decomposition rates in six restoration sites with varying time since restoration and bison presence. Dung decomposition rates varied with the age (time since restoration) of sites. Dung beetles were more abundant in bison-grazed sites, and dung decomposition was also greater in these sites. Further research will be able to determine the proportional role of individual beetle species in this critical ecosystem service.

62 Mark Voelker

*Experimental Evolution of Multicellularity using Symbiodinium Dinoflagellates from Coral*

**Author(s):** Mark Voelker, Jeff Golladay, Therese Milet, Jacey Strohecker, Neil Blackstone  
**Department:** Biological Sciences  
**Faculty Mentor(s):** Neil Blackstone  
**Session Time:** 9:00am - 10:15am

The complexity of life is the result of a process rather than an inceptive feature. Life on Earth has undergone a handful of major transitions, including the evolution of multicellularity, and these transitions have given rise to more complex organisms from those with lesser complexity. To elucidate the mechanisms behind these types of transitions, studying the evolution of multicellularity with an experimental approach is required, rather than using just the traditional comparative method. For this reason, we set out to examine the effects that different selective regimes may produce on the fitness and growth patterns of a simple unicellular organism. In this experiment, a cultured unicellular dinoflagellate, *Symbiodinium*, was allowed to evolve over a period of 15 months (over 1300 generations) in a benthic regime. In contrast, planktonic cultures in which the symbionts were grown in glass tubes were constantly rotated in a hematocrit mixer for 6 months (500 generations). Clustering and cell-adhesion were highly selected for in the benthic cultures because of competition with algae, while symbionts with less cell-adhesion and thus more buoyancy were highly selected for in the planktonic cultures. After a 6-month period, the *Symbiodinium* were imaged via light and electron microscopy to assess the changes that had taken place during the many generations of separate selective regimes. The results suggest that not only did the symbionts subject to the alternative selective regimes differ dramatically in size, but the benthic symbionts were better able to form multicellular clusters than the planktonic ones.

63 Taylor Riggins-Walker

*Search for New Anti-infective agents: Synthesis and Characterization of IspF inhibitors*

**Author(s):** Taylor Riggins-Walker  
**Department:** Chemistry and Biochemistry  
**Faculty Mentor(s):** Timothy Hagen  
**Session Time:** 10:15am - 11:30am

There is a pressing need to treat infectious diseases, The bacterium Burkholderia pseudomallei causes Whitmore’s disease and possesses the essential methylerythritol pathway (MEP). The MEP pathway is found in majority of bacteria but not in humans, making it a great candidates for new antibiotics. The IspF enzyme is one of seven that can be inhibited. Inhibitors of this enzyme have been targeted using X-ray fragment hits and literature inhibitors. This poster will discuss the synthesis of potential IspF inhibitors as well as their characteristics. Characterization was accomplished via 1H and 13C NMR, mass spectroscopy and IR spectroscopy.

64 Jeffrey Heise

*Soil stoichiometric (C:N) response to prescribed fire in tallgrass prairie*

**Author(s):** Jeffrey Heise, Holly Jones, Nick Barber, Ryan Blackburn, Karley Chantos  
**Department:** Biological Sciences  
**Faculty Mentor(s):** Holly Jones  
**Session Time:** 11:30am - 12:45pm

Prescribed annual burns have long been used in remnant and restored prairies to boost nutrient cycling and control unwanted species. Moreover, prairie grazers tend to prefer recently-burned sites, which is often termed pyric herbivory. Plant and soil stoichiometry, specifically C:N, can be used to quantify the quality of the resource for grazers (plants) and
microbes (soils). While the impacts of fires on soil and plant stoichiometry are known in old field prairies, little research has been done in more recently-restored ecosystems, especially those with newly-reintroduced grazers. This study examined how prescribed burns have affected soil stoichiometry (C:N), as well as general plant grazers. We used matched pairs of burned and unburned sites with similar restoration ages. The first pair were restored in 2010, and the second pair were restored in 2001. These were also compared to samples collected in remnant areas of the prairie. Three soil samples were taken from each planting. Soil samples were sieved and analyzed for total carbon and nitrogen using a mass spectrometer. Data were analyzed using general linear mixed models. Analysis of the composition of the four sites showed that they were each approximately 40% C4 grasses, 10% C3 grasses, 20% forbs and legumes, and 30% bare ground or thatch. Burned soil C:N had a modeled average of 14.22 and unburned soils had significantly lower C:N, averaging 13.1. When looking at previous years’ history of burns, we found that soil C:N increased by 0.86 in each successive year that a prairie is burned, with those not burned averaging 13.2, those burned recently averaging 14.22, and those burned two years in a row averaging 15. This indicates that nitrogen is lost from soils as they are successively exposed to fire. The nitrogen loss may be from volatilization following fires, but it remains to be seen whether plant C:N follows a similar pattern and if it varies by nutrient uptake strategy (C3, C4, legumes). Plant C:N will be measured in summer 2017.

65 Sydney Wieczorek  
**Viruses of Freshwater Algae from Northern Illinois**

Author(s): Sydney Wieczorek, Scott Grayburn  
Department: Biological Sciences  
Faculty Mentor(s): Scott Grayburn  
Session Time: 12:45pm - 2:00pm

Algae fix significant amounts of carbon dioxide and are important components of global carbon and nitrogen cycles. Viruses that infect and lyse freshwater algae are thought to be abundant but few have been studied in detail. The well-studied algae virus PBCV-1 and its algae host were used to compare different methods to concentrate viable virus. The primary method of detecting virus and algae interactions was through plaque assays. Methods to enrich control viruses through filtration, flocculation, and centrifugation were tested and used with samples from the local environment. Samples processed for viral enrichment were used for algae infection assays using six different strains of unicellular algae (Chlorella variabilis NC64A, Monoraphidium Dek19, Chlorella 32b, and industrial strains of Chlorella sorokiniana CS1228, CS1230, CS1412). DNA from different environmental isolates was isolated and analyzed using the polymerase chain reaction (PCR). The PCR primer pairs used in this study recognized one algae sequence (LSU) and four viral sequences (beta 1.3 glucanase, DNA polymerase, and two conserved regions for major coat proteins from different virus families). Viral plaques were recovered from the Northern Illinois University lagoon after incubation with the algae Chlorella variabilis NC64A and amplified to high titre. PCRs of DNA from these viruses showed variability with primers for beta 1.3 glucanase. The high titre virus stocks were tested for plaque formation in six different algae strains.

66 Anita Latgnotha*, Van Bui  
*yIrradiation Effects on Autophagic Flux in Glioblastoma Cells*

Author(s): Anita Latgnotha, Van Bui, Linda Yasui  
Department: Biological Sciences  
Faculty Mentor(s): Linda Yasui  
Session Time: 9:00am - 10:15am

Glioblastoma multiforme (GBM) is an incurable, deadly brain cancer. Even after aggressive therapy including surgery, radiation, and chemotherapy with temozolomide near universal recurrence of disease results to death in most cases. Improved treatments are urgently needed. We propose to enhance radiation therapy by targeting autophagic flux, a specific aspect of a promising therapeutic target termed autophagy. To measure autophagic flux we engineered GBM cells to express an autophagic flux reporter that consists of the autophagy marker protein, LC3, linked to an enhanced green fluorescent protein (eGFP) and a red fluorescent protein (mCherry). These cells were imaged using a confocal laser scanning microscopy to acquire data on early stage (yellow puncta) or late stage autophagosomes (red puncta) in single z-stacks of irradiated or sham treated cells on day 1, 5, and 7 after treatment. From these parameters, we found that autophagy proceeds at a basal rate in all U87 and U251 cells and irradiation with 10 Gy g rays led to an increase in induction of autophagy. Further, the level of autophagy was higher in U87 cells compared to U251 cells (the average number of puncta was higher in U87 cells) and thirdly, exposure of U87 cells to 10Gy g rays led to a decrease in autophagic flux. In contrast, U251 cells showed a complex pattern of autophagic flux changes in U251. Observing and analyzing the impact of radiation therapy on brain cancer cells will provide a better understanding of the contribution of autophagy to radiation sensitivity which can be used to attain our goal of improving the therapeutic response in GBM.
67  Leena Ghrayeb
*Synthesis of Bioboron Compounds for Cancer Therapy*

Author(s): Leena Ghrayeb  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Narayan Hosmane  
Session Time: 10:15am - 11:30am

This project was carried out under the supervision of Dr. Narayan Hosmane of the Chemistry and Biochemistry department at Northern Illinois University. The goal of this project is to create bioboron compounds that are to be used in boron neutron capture therapy for cancer. A certain isotope of boron, boron-10, has shown promise in effectively and efficiently killing cancer cells, but it must have a carrier. I worked to create a carrier compound using guanine, which will later be used in BNCT. This research is focused on the synthesis and characterization of this bioboron compound. Through my research, I learned more about this promising cancer therapy, and I hope that I can contribute something significant as I continue with this research.

68  Isabella Huminsky
*The Discovery of Extinct Hippopotami Fossils in Anjohibe Cave*

Author(s): Isabella Huminsky  
Department: Biological Sciences  
Faculty Mentor(s): Karen Samonds  
Session Time: 11:30am - 12:45pm

Madagascar is a country known for its incredible biodiversity, but it has lost the majority of its distinctive megafauna. In a progressive extinction event still not widely understood, Madagascar lost its giant lemurs, hippopotami, crocodylians, elephant birds and tortoises species. This research project focuses on the extinction of the pygmy hippopotamus from Anjohibe cave, and includes the description of multiple adult individuals as well as one juvenile. There are currently three extinct hippo species native to the island; Hippopotamus madagascariensis, Hippopotamus lemerlei, and Hippopotamus laloumennia. Evidence suggests that the species discovered in Anjohibe Cave was Hippopotamus madagascariensis. Recent habitat transformation and degradation in this region has changed the habitat around the cave system—while it used to be very forested and moist, it is currently much more dry and degraded. Given the strong build of the skull, it can be concluded that this species was likely more land-based. The possible role of habitat change in the extinction of this species, as well as hunting, is explored. Dating of fossils from these species indicate that the majority of these animals were alive when humans came, and that they overlapped for at least a millennium.

69  Maria Weston
*Landscapes of fear on the prairie: Bison wallowing impacts on small mammal seed predation*

Author(s): Maria Weston, Holly Jones, Nick Barber  
Department: Biological Sciences  
Faculty Mentor(s): Holly Jones, Nick Barber  
Session Time: 12:45pm - 2:00pm

Small mammals and invertebrates contribute to seed removal and dispersal, which can shape ecosystem functioning, especially in grasslands. Many prairie restorations have begun to reintroduce bison (Bison bison), but it is unknown how this will impact seed predation. Bison wallow, which eliminates vegetation and creates large bare ground areas. This could create “landscapes of fear” where wallowed patches are less frequented by seed predators due to fear of predation. We experimentally manipulated seed availability and seed size in 50 sites with three treatments: 1) accessible to all seed predators, 2) accessible to invertebrate seed predators, and 3) excluding all seed predators (control). Using general linear models, we compared how seed removal changed in wallows vs. in vegetation and based on seed size. Our preliminary analysis shows that more seeds were removed when open to all seed predators. However, we found little impact of bison wallows on seed predators, indicating that newly-reintroduced bison wallowing does not impact the behavior of seed predators in our study system. We are currently exploring the mechanisms behind seed removal, including the role of moonlight and precipitation, and how that may alter the behavior of seed predators.
70  Rebecca Maas<sup>a</sup>, Jessica Cox, Van Bui, Rabina Kumpakha

Culturing glioblastoma cancer stem cells

Author(s): Rebecca Maas, Linda Yasui, Jessica Cox, Rabina Kumpakha, Van Bui
Department: Biological Sciences
Faculty Mentor(s): Linda Yasui
Session Time: 9:00am - 10:15am

The purpose of this project is to successfully grow and characterize glioblastoma (GBM) cancer stem cells (CSCs) from cultured cell lines, U87 and U251. GBM is the most prevalent and malignant type of brain cancer of humans and CSCs are the population of cells that are more resistant to radiation therapy and are therefore, primarily responsible for tumor recurrence. CSCs are characterized by their potential for limitless replication, self-renewal, multi-lineage differentiation and tumorigenicity. Culture of CSC spheres under serum-free culture conditions, in the presence of growth factors (EGF and FGF) and B27 supplements has been reliably achieved. Characterization of the CSC phenotype is underway. The spheres will form clones (self-renewal) as indicated by a standard clonogenic assay and a limiting dilution assay. Further, expression of several stem cell markers (CD133, nestin and Musashi) provide some evidence for an enhanced population of CSCs. Immunohistochemical staining as well as ultrastructural analysis supports these results. Verification of the stem cell state will permit us to use these cells from spheres to search for the Achilles heel of CSCs.

71  Rebecca Rasmussen

Enzymatic Stabilization Through Antibody Fragment Binding

Author(s): Rebecca Rasmussen, Sriram Jakkaraju
Department: Chemistry and Biochemistry
Faculty Mentor(s): James Horn
Session Time: 10:15am - 11:30am

Genetic-based engineering of proteins opens new opportunities in life science applications. One possible use of genetic modification is protein thermal stabilization. This may be particularly useful for enzymes, which typically possess only moderate stability over a small temperature range. Here, we explore methods to enhance the stability of carbonic anhydrase, a zinc-metalloenzyme used that facilitates the interconversion between carbon dioxide and bicarbonate. Specifically, we are interested in examining how engineered thermal stability relates to retention of function at elevated temperatures. To evaluate both the original enzyme as well as modified variants, circular dichroism was used to measure the structural stability by determining the melting temperature (Tm) of carbonic anhydrase. A spectroscopic activity assay was used to compare enzyme function at various temperatures of the original and modified variants.

72  Jessica Cox

Pancreatic cancer β-cells: Too hungry to eat, too hungry not to eat

Author(s): Jessica Cox, Nicole Baker, Hannah Savage, Channing Der, Linda Yasui
Department: Biological Sciences
Faculty Mentor(s): Linda Yasui
Session Time: 11:30am - 12:45pm

Since its identification as a potential requirement for cancer cell growth driven by mutant K-Ras, TBK1 has gained traction as a potential target in the treatment of cancer. Studies have elucidated how TBK1 functions downstream of Ras in cancer. The RaLB-Sec5 effector complex has been shown to recruit TBK1 and decrease apoptosis induction by stress on the cell, while promoting tumorigenesis. Alternatively, if RaLB is not ubiquitinated, RaLB will form a complex with Ex084 that will recruit beclin and act as a scaffold for autophagy. Therefore, we hypothesized that inhibition of TBK1 will tilt the equilibrium between tumorigenesis and autophagy towards autophagy. Initial studies using a novel, selective inhibitor of TBK1, LSN3090729 resulted in pronounced vacuolization in 2 different LSN3090729-sensitive pancreatic ductal adenocarcinoma cell lines (HPAC and PANC1). We focused on 3 questions that emerged from this observation. 1). “Are these vacuoles actually autophagosomes?” Ultrastructural analysis of a timed progression of vacuolization in these cells was designed to answer this question (determine if vacuoles were autophagosome). 2). “Are these vacuoles manifestation of methusosis?” a novel cell death pathway involving pinocytosis. Ultrastructural analysis could also provide answers this question by finding increased numbers of clathrin-coated pits for pinocytosis. 3). Decide what the vacuoles were. If the vacuoles are not identified as autophagosomes, we wished to determine their origin or what they were. Results from these studies pointed towards another major degradation pathway, crinophagy, that was proceeding simultaneously with autophagy, indicating cell self-eating and not eating were occurring.
73 Afreen Warsi, Jason Gramling
Degradation of plastics using Exiguobacterium Roc37 and the Fungus 16E12

Author(s): Afreen Warsi, Jason Gramling
Department: Biological Sciences
Faculty Mentor(s): W. Scott Grayburn
Session Time: 12:45pm - 2:00pm

Plastics in the environment can cause huge problems. In this study, a bacterium, Exiguobacterium Roc37, and a fungus designated 16E12, were grown on minimal media that used different plastics as sources of carbon. Growth was tested on the petrochemical plastics Styrofoam, LDPE (low density polyethylene), a plastic used in various packaging and containers, and HDPE (high density polyethylene), a plastic used for more heavy-duty applications like piping, folding chairs and tables. The renewable bioplastics PSM (plastarch material), a plastic used in food packaging, as well as industrial and construction uses, and PLA (polylactic acid), a recyclable plastic used in various medical applications, packaging, and 3D printers, were also tested for their ability to support microbial growth. Roc37 was able to metabolize the plastics LDPE, PLA, and PSM. Real time quantitative PCR (qPCR) studies investigated expression levels of different genes in Exiguobacterium Roc37 that were grown in media with glucose or plastic as the carbon source. The fungus 16E12 was able to metabolize the plastic LDPE. It could use reagent grade LDPE and an autoclaved piece of a plastic bag made of LDPE as carbon sources. LDPE is a serious globally abundant plastic pollutant. Polyethylene is one of the two most abundantly produced plastics worldwide. Fungal growth was also seen on PSM and strong growth was observed on PLA.

74 Sylwia Marianski
The rmtA gene in the pathogenic fungus Aspergillus fumigatus

Author(s): Sylwia Marianski, Roshan Dahal
Department: Biological Sciences
Faculty Mentor(s): Ana Calvo
Session Time: 9:00am - 10:15am

The fungus Aspergillus fumigatus is an opportunistic human pathogen capable of causing a life threatening systemic lung infection known as invasive aspergillosis via inhalation of asexual spores known as conidia. Due to the medical relevance of this organism, it is imperative to discover novel genetic elements to design antifungal drugs around to ultimately control the dissemination, virulence and survival of A. fumigatus during human infection. Previously, the putative arginine methyltransferase gene rmtA has been characterized in the model organism Aspergillus nidulans and the opportunistic plant pathogen Aspergillus flavus where it was shown to regulate several cellular processes, including those related to the regulation of morphological and chemical development. Our current study focuses on the characterization of the rmtA gene in A. fumigatus. We hypothesize that rmtA could play an important role in the biology of this medically relevant opportunistic pathogen, including its asexual reproduction, secondary metabolite production, oxidative stress response and virulence.

75 Krystal Do
Characterization of The Binding Thermodynamics of Metal Cofactors for IspF

Author(s): Krystal Do, Dakota Grote
Department: Chemistry and Biochemistry
Faculty Mentor(s): James Horn
Session Time: 10:15am - 11:30am

The characterization of the binding properties of the Zinc ion, a metal cofactor, for the IspF enzyme revealed details of critical interactions that allows to better understand IspF function. the use of the isothermal titration calorimeter (ITC), a sample of IspF was titrated with a Zinc solution, using Buffer-Zinc titration as a control. This was done to isolate ligand and protein interactions from the interference of buffer solution. As Zinc has a 2+ charge and another 2+ metal ion, Magnesium, which is another vital cofactor for the function of IspF, was tested in the same manner. The titration comparison between the two 2+ metal cofactors can reveal their differences in binding thermodynamics in Burkholderia pseudomallei IspF. Further studies will be carried out against another IspF sample from Escherichia coli, as well as other 2+ metal ions.
76  Slafe Aslam  
Testing antibiotics residue presence in water using IDEXX Snap test kits

Author(s): Slafe Aslam  
Department: Environmental Studies  
Faculty Mentor(s): Melissa Lenczewski  
Session Time: 11:30am - 12:45pm

The use of antibiotics in everyday life is increasing day by day and also an emerging contaminant in our environment especially in water. It is essential to have a fast (10 minutes) and reliable antibiotics residue test for water available to screen for antibiotic in water supplies and recreational water. The main objective of this research experiment is to test for the presence antibiotic residue in water using the IDEXX Snap™ test kits. IDEXX Snap™ test kits were originally designed for testing for the presence of antibiotics in milk. Many studies have been done for screening tests in milk with IDEXX Snap™ tests but not in water. Dilutions were made in water for antibiotic Chlortetracycline, Tetracycline, Oxytetracycline, Ampicillin, Amoxicillin, Penicillin, and Sulfamethazine and tested from 100ppb to the detection limit of the kit. The results showed that the IDEXX snap tests worked were able to detect the antibiotic residue presence in water except Gentamicin.

77  Anna Phillips  
A Study of Periodic Trends of Hypervalent Trihalides Using Computational Methods

Author(s): Anna Phillips  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Lee Sunderlin  
Session Time: 12:45pm - 2:00pm

The differences in electronegativity between the central and adjacent atoms in hypervalent trihalide systems as well as their atomic radii were analyzed in order to determine whether these values could be used to predict trends in the magnitude of bond dissociation energies (BDEs). Experimental BDE values were unavailable for many of the molecules analyzed due to high instabilities, so a complete set of calculated values was used instead. The CCSDT model was determined to be the most accurate of the computational methods that could be applied to all molecules, with an average difference from the experimental values of 8 kJ/mol. The inverses of the covalent atomic radii proposed by Cordero and colleagues were found to have the strongest correlation with the CCSDT model, with a chi-squared value of 0.93.

78  Brittany Gaspari  
Screening Inhibitors of Methylyerythritol Phosphate (MEP) Pathway Enzymes

Author(s): Brittany Gaspari  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Victor Ryzhov  
Session Time: 9:00am - 10:15am

A method designed specifically to screen for enzyme inhibitors that can be used as antibiotics was developed through the application of high resolution separations. The MEP pathway is an important target for antibiotic development because only bacteria and not humans use it. Therefore, antibiotics developed that target this pathway would potentially show fewer harmful side effects. The developed methods separate and quantitate compounds in the IspD, IspE, and IspF enzyme catalyzed reactions via Strong Anion Exchange Liquid Chromatography (SAX), Hydrophilic Interaction Liquid Chromatography (HILIC), and Ion-Pair Reversed Phase High Performance Liquid Chromatography (IP-RP-HPLC). Information from these methods is used determine the effectiveness of compounds thought to act as inhibitors against MEP pathway enzymes with the goal of screening a library of potential inhibitors to identify those with sufficient potency to yield further study.
Jordan Rucinski  
**Hybrid Inorganic-Organic Perovskite Solar Cells**

Author(s): Jordan Rucinski  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Tao Xu  
Session Time: 10:15am - 11:30am

Perovskite solar cells are a promising alternative energy source. This research explores two types of perovskites: lead iodide perovskites and tin iodide perovskites. There are various issues that must be addressed in fabricating these two types of solar cells. These include degradation due to humidity, thermal instability, phase instability, thin film uniformity, and more. By introducing new ligands and by replacing toxic lead, we can increase the stability of perovskite and the ability to create an environmentally friendly and scalable solar cell. In addition, polymers as reducing agents can improve the stability of tin based perovskite. A new polymer or ligand is introduced, a doped solution with the polymer or S/Se is made, the film is made, and then the stability of the sample is tested. If a stable cell is achieved, a full solar cell is made and the efficiency is tested. An increased stability of lead based perovskite has been achieved by using S/Se.

Sarah Barman  
**Diverse microbial communities thriving in an extremely alkaline industrial run-off site**

Author(s): Sarah Barman, Ingemar Ohlsson, Wesley Swingley  
Department: Biological Sciences  
Faculty Mentor(s): Wesley Swingley  
Session Time: 11:30am - 12:45pm

Located in southeast Chicago, IL, Indian Creek is a waterway that connects Wolf Lake to the Calumet River. Normal aquatic growth is prevented by the layer of calcium carbonate precipitate that fills the creek bed within inches of its surface. Formed by the weathering of calcium silicates in the locally discarded steel slag, this precipitate is indicative of the highly alkaline conditions observed at this site. The highest recorded pH was in excess of 13, and despite the seemingly hostile conditions, microbes of various phyla were found to thrive in this environment. The goal of this project is to identify as many as possible of these extremely alkali tolerant species through laboratory culturing and characterizing techniques. Samples were taken from the carbonate precipitate and cultured for isolation on general media agar, with pH adjusted to 9 and 25% medium strength to promote growth of less numerous species. Preliminary characterization of isolated species can be achieved through differential biochemical tests, establishing characteristics such as Gram character, organic substrates, and nitrate reduction ability. Results of these preliminary tests can be compared with documented species to establish a tentative identification. Along with sequencing and genomic analysis of isolated species, this will identify known bacterial species inhabiting Indian Creek, and provide a basic metabolic profile for previously unknown species. Uncovering the metabolic capacities of bacteria in Indian Creek may indicate future candidates for bioremediation of high-pH industrial waste sites among other environmental applications.

Alex Thomas  
**Controlled Release Liposomal Drug Delivery for Treating Ocular Angiogenesis**

Author(s): Alex Thomas, Jeffrey Benner, Steven Cohen, Kalyan Karumanchi, Elizabeth Gaillard  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Elizabeth Gaillard  
Session Time: 12:45pm - 2:00pm

The goal of this experiment was to develop a sustained release ocular drug delivery system to improve the release kinetics of the anti-VEGF drug Bevacizumab (Avastin) which is used to treat diseases characterized by ocular angiogenesis. This was achieved by covalently attaching a fluorescent label to Avastin and encapsulating these proteins in different liposomal formulations. The hydrodynamic diameter, surface morphology, thermal stability and in vitro release kinetics of the liposome formulations were examined using dynamic light scattering, transmission electron microscopy, differential scanning calorimetry and dissolution studies, respectively. The in vitro drug release study was conducted using a SOTAX USP IV dissolution apparatus. The liposomal formulations after extrusion exhibited a narrow size distribution of approximately 100-150 nm in diameter with around 85-92% encapsulation efficiency. From the in vitro drug release studies, we observed a timed release over a period of 6-8 months depending on the composition of
the formulation. Liposomal compositions were modified to improve the stability and to extend the time of release. Abrishami et al have been able to obtain a sustained release of the anti-VEGF drugs up to a period of 42 days. We have been successful in encapsulating a model protein into our stable liposomal formulations and employing different intravitreal administration strategies to obtain a controlled release over a period of 6-8 months in vitro.

82 Gabriela Fuentes
Synthesis of Lithium Intercalated Boron Nitride Nanotubes

Author(s): Gabriela Fuentes, Narayan Hosmane, Vijayaraghavan Kavalakunda, Roxana Moraga
Department: Chemistry and Biochemistry
Faculty Mentor(s): Narayan Hosmane
Session Time: 9:00am - 10:15am

Synthesis of Lithium Intercalated Boron Nitride Nanotubes (Li-BNNT) was conducted in an attempt to gain access to their promising applications for electronics, lithium batteries, hydrogen storage, and supercapacitors. Through a series of reactions pure nanotubes intercalated with lithium are expected to show in the product. A variety of reactions are engineered to create optimal conditions for the product and the reaction is conducted at 700° or 800°C with zinc acting as a catalyst. The products were then purified using hexane and characterized using Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), and Energy-dispersive X-ray Spectroscopy (EDX). Further purification, functionalization, and application will be performed to access the promising applications that Li-BNNT offers.

83 Alejandra Macias
Adenine in Boron Neutron Capture Therapy

Author(s): Alejandra Macias
Department: Chemistry and Biochemistry
Faculty Mentor(s): Narayan Hosmane
Session Time: 10:15am - 11:30am

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 the chemical element Boron. 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, there must be a way to send Boron to a tumor cell inside the body. This can be accomplished by using biomolecules, which are molecules that all living organisms need to function, such as proteins, carbohydrates, lipids, and nucleic acids. A tumor cell uses these biomolecules to stay alive. If boron is attached to a prepared biomolecule, in this case, adenine, the tumor will take it and the boron attached to it will kill the tumor cell. The purpose of this project is to find a biomolecule that will successfully accomplish the process.

84 Lauren Zuidema
The Synthesis of Carborane-Appended Dopamine and L-Dopa for Boron Neutron Capture Therapy

Author(s): Lauren Zuidema, Lucas Kuzmanic, Prabhuodeyara Gurubasavaraj, Narayan Hosmane
Department: Chemistry and Biochemistry
Faculty Mentor(s): Narayan Hosmane
Session Time: 11:30am - 12:45pm

Boron Neutron Capture Therapy (BNCT) is a bimodal cancer treatment that is based on the selective accumulation of boron into cancer cells using biologically compatible boron delivery agents. The focus of current research has been on the synthesis of boron delivery agents which have a high boron content. Therefore, biological molecules Dopamine and L-Dopa were conjugated with o-carborane to synthesize boron delivery agents to be used for BNCT. The products were purified using column chromatography, and characterized using Nuclear Magnetic Resonance Spectroscopy (NMR) and Fourier Transform Infrared Spectroscopy (FTIR). In the future, biodistribution studies will be performed to ensure biological compatibility as well as tumor cell uptake.
The purpose of this project was to compare the in vivo release kinetics of Bevacizumab (Avastin) released from liposomes trapped in hydrogels and drug depot implants. The liposomes with sustained release of the antibodies were trapped in hydrogels and implants to increase barriers for drug release and thereby extending the time of release. Fluorescently labeled Avastin was encapsulated in a cocktail of different liposomal formulations. Dutch belted rabbits were used as animal models to compare controls with various strategies like liposomal injections and hydrogels to achieve the sustained release of Avastin over a longer period of time. Sustained release and diffusion of the fluorescent labeled antibodies in the rabbit eye was screened using a Fluorotron spectrofluorometer on a weekly basis. Drug release kinetics were compared between rabbits that received injections of Avastin, Avastin loaded liposomes, and Avastin loaded liposomes trapped in hydrogels. We measured the auxiliary concentration of the fluorescently tagged Avastin in the anterior chamber, vitreous, and the posterior segment of the rabbit eye to screen the diffusion of drug to the target site. It was observed that hydrogel-trapped liposomes release Avastin at a much slower rate than liposomes alone. Immunohistochemistry and toxicity studies are currently in progress. With this study, it appears that it is possible to decrease the frequency of intravitreal injections from 12 to 2 per year, thereby making the treatment regimen more economical and increasing the patient compliance.

The goal of this project is to participate in studies that will improve abilities to diagnose and manage several human retinal disorders such as age related macular degeneration and diabetic retinopathy. The main focus in the lab currently is working with Dutch-beltd pigmented rabbits, and monitoring their care after the surgery of implanting a slow-drug release device into the eye. This, when in human patients, would allow for drugs to be delivered via a slow-release mechanism instead of current technology which uses injections directly into the eye to deliver the drug.

Boron Neutron Capture Therapy (BNCT) is a method of cancer treatment that involves killing cancer cells through a nuclear reaction of two nontoxic species, boron-10 (10B) and thermal neutrons. The helium α-particles and lithium nuclei that result produce closely spaced ionizations near the reaction site and dissipate their kinetic energy over the diameter of the cell. The lethality of these particles is limited to only boron-containing cells, and therefore, the most important requirement of BNCT is the amount and selective accumulation of 10B into the cancer cells while minimizing uptake into the surrounding healthy tissue. Current BNCT research focuses on the synthesis of novel compounds with high boron content as well as methods for their delivery into the tumor cell. A fluorescent tag can allow the observation of cellular uptake during biodistribution studies. Here, a carboranyl-fluorescein conjugate was synthesized and biologically evaluated through studies in squamous cell carcinoma and pancreatic cancer cell lines. Cellular uptake was confirmed through fluorescent and confocal microscopy, as well as flow cytometric data. The uniform distribution of fluorescein-tagged 1-methyl-o-carborane in these cell lines in addition to its moderate cytotoxicity and higher boron content relative
to the boronated agents currently employed in clinical trials, namely sodium borocaptate (BSH) and borophenylalanine (BPA), provide justification for its further evaluation as a potential BNCT agent.

88  Ajinboye Uwensuyi  
*Molecular Dynamics Simulations of the Structure and Functions of Aqp-0*

Author(s): Ajinboye Uwensuyi, Elizabeth Gaillard, Bao Linh Nguyen  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Bao Linh Nguyen Elizabeth Gaillard  
Session Time: 12:45pm - 2:00pm

To analyze and understand the structure and functions of Aquaporin-0 utilizing molecular dynamic simulations. Aquaporins-0 functions as membrane pores that are highly selective for water which form thin junctions between fiber cells in the eye. The Aquaporin-0 play an important role in protein interaction in lens fibre cells and maintain optimal water levels in avascular lens. Mutations of Aquaporin-0 impair the water transport mechanism which result in cataracts. Molecular dynamic simulations were used to study the wild and mutant aquaporin in aqueous conditions. Classic Newtonian mechanics was used to model the system using NAMD and VMD. NAMD (Not Another Molecular Dynamics Simulation) and VMD (Visual Molecular Dynamics) are computer programs that model biomolecules. The in silico study of AQP-0 will determine how the mutations of Asp-150 in AQP-0 changes the channel conformations which results in cataracts.

89  Elisa Weiner  
*Solvothermal Synthesis of Fe-MOF-74*

Author(s): Elisa Weiner  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Timothy Perkins  
Session Time: 10:15am - 11:30am

Metal organic frameworks (MOFs) are a class of crystalline solids defined by organic ligands linking to metal vertices. By tailoring the ligands and/or metal centers, MOFs can be rationally designed for specific applications. For this synthesis iron(ii) chloride tetrahydrate and 2,5-dihydroxyterephthalic acid were used with changing solvents. The solvents that have shown the best results to date are a mixture of DMF, IPA, and water. My goal is to recreate MOF-74 with an iron base, in order to create a self cleaning diesel filter. This filter would be coated with the synthesized crystal containing a non-bio based detergent. The idea is when the diesel engine heats up, the crystal will disassociate and start to release the detergent. The detergent will then clean the diesel engine due to particle build up as the temperature increases in the engine, resulting in a longer life span for the diesel engine. This filter would allow companies to save money on diesel engines and have trucks on the road for a longer period of time. Future solvent changes are currently being made to create a more stable structure.

90  Noel Amaro  
*Isotopic Studies of Oxygen 18 Formation in Calcite*

Author(s): Noel Amaro  
Department: Chemistry and Biochemistry  
Faculty Mentor(s): Chong Zheng, Lee Sunderlin  
Session Time: 12:45pm - 2:00pm

Many elements are known to have a set number of isotopes. These isotopes exist in a certain abundance in nature. The abundances are slightly different in different environments and different temperatures. Oxygen 18, for example, is one such isotope which is used to help determine past temperatures from fractionation of artic ice. Ice diffusion however makes for difficulty in accuracy. Calcite, which consists of CaCO3 exists in the shells of micro animals; once the animal has passed the calcite remains allows for an opportunity to determine the environment in which the animal lived. In this computational study the calcite is examined to determine the interaction of oxygen 16 and oxygen 18 in a calcite lattice to compare to experimental studies on oxygen 18 fractionation.
91 Zohra Sattar

Combating Pathogens through Synthesis of IspF Inhibitors via the Bignelli Reaction

Author(s): Zohra Sattar, Sydney Watkins, Timothy Hagen
Department: Chemistry and Biochemistry
Faculty Mentor(s): Timothy Hagen
Session Time: 11:30am - 12:45pm

The enzyme 2C-methyl-D-erythritol 2,4-cyclodiphosphate synthase (IspF) is a crucial enzyme that may be inhibited for antimicrobial activity. IspF is one of seven enzymes that use the methylenerythritol phosphate (MEP) intermediate to form isopentenyl pyrophosphate (IPP) and dimethylallyl pyrophosphate (DMAPP)—biosynthetic building blocks required by all organisms—via the MEP pathway. The MEP pathway and IspF are ideal targets for enzyme inhibition because the MEP pathway is found in bacteria, malarial parasites, and higher plants but is not found in mammals; as a result, a MEP enzyme inhibitor should kill pathogens with few side effects to humans. This project focuses on synthesizing pyrimidines to inhibit IspF and halt bacterial and malarial anabolism. Three synthetic routes were carried out to synthesize pyrimidines via the endothermic cyclization Bignelli reaction. The first two synthetic routes employing hydrochloric acid and iodine catalysts respectively did not produce a product in measurable yield, and the third synthetic route produced an impure product that will be purified to isolate the pyrimidine. After the pyrimidine is synthesized, it will be used as a reagent in further organic reactions to synthesize an IspF inhibitor that will be characterized via saturation transfer difference nuclear magnetic resonance spectroscopy (STD-NMR) to observe the binding of the inhibitor in the IspF active site.

92 Mark Nogalo

Synthesis of Ortho-carborane (C2B10H12) Derivative Necessary for Click Reaction with Alkylated (L)-glutamine Derivative

Author(s): Mark Nogalo
Department: Chemistry and Biochemistry
Faculty Mentor(s): Narayan Hosmane
Session Time: 12:45pm - 2:00pm

Lithiation and attachment of 4-vinylbenzyl to Ortho-carborane is explored to eliminate dependence on 1-methylolthorcarborane. Ortho-carborane is utilized in order to find an improved Boron drug used in Boron Neutron Capture Therapy (BNCT). Currently, there are two Boron drugs utilized in BNCT therapy, Borophenylalanine (BPA) and Sodium Borocaptate (BSH). Currently, two reactions have been synthesized to reach the third step of the reaction. Lithiation of Ortho-carborane is done at -780C with dry ice/acetone. Next, flask is cooled once to -780C and 4-vinylbenzyl chloride is injected into flask slowly, and color change is observed halfway through addition of 4-vinylbenzyl chloride. Glutamine is pursued due to cancer cells needing to produce nitrogenous compounds in the form of nucleotides. The process of alkylation O-carborane products were first purified by removing DME, then with Extraction with Et2O/H2O. Product was characterized by 1H NMR 11B NMR, and 13C NMR. So far, the Ortho-Carborane derivative has been made and confirmed by Proton, Boron, and Carbon NMR. X-ray Crystallography will be utilized in order to confirm compound and its structural form. Further progress will involve completing the Ortho-carborane scheme and the (L)-Glutamine alkylation.

93 Darren Norris

Work related message response pressures: Formality factors of work related communication response expectations during off-work times.

Author(s): Darren Norris
Department: Communication
Faculty Mentor(s): Mary Lynn Henningsen
Session Time: 10:15am - 11:30am

This study evaluates the relationships among various factors in responding to professional communication when not at work through the use of smart phone technology. The study addressed the medium of the message, the nature of the message, the formality of the message, and the context of receiving the communication. The study was framed in expectancy violations theory (EVT, Burgoon & Hale, 1988) and recent research on telepressure (Barber & Santuzzi, 2015). The purpose of examining the influence of telepressure on work related communication was to address the features and expectations that influenced interpretation and possible response to supervisor communication during off-work
times. The design of the study was a 2 (medium: text or email) x 2 (violation valence: positive or negative) x 2 (formality: formal or informal) x 2 (context replication: haircut or oil change) experiment. Participants read a scenario about receiving a message from their workplace supervisor outside of work hours. Participants then completed scales assessing their likely response time and interpretation of the message. EVT guided the construction of the interpretation scales such that individuals reported the violation expectedness, violation valence, and violation importance. For this study, adults who use cell phone technology for work related communication were recruited. The study results are described in relation to the implications for EVT and telepressure research.

94 Johna Pishko

_A Critique of Midwestern Models of Community Gardens: How can the Community Garden Become an Effective Tool to Reduce Long-term Food Insecurity_

Author(s): Johna Pishko, Courtney Gallaher, Kristen Borre, Abi Blodel, Kristen Amstutz, Rachel Lechuga, Manuel Montalvo
Department: Environmental Studies
Faculty Mentor(s): Courtney Gallaher, Kristen Borre
Session Time: 9:00am - 10:15am

Midwestern communities have engaged in community gardening for many generations, and urban gardens have been instrumental and popular for reclaiming unproductive land for growing food as a part of a local food system. Community gardens are popular, but limited in their ability to end food insecurity for several reasons; however, can a community garden model be developed to construct resilient, sustainable, and equitable access and availability to local, nutritious foods? What are the key components of a local food system that can significantly reduce or eliminate food insecurity due to poverty? A research partnership between the Dekalb County Community Gardens (DCCG) and the Northern Illinois University has examined different models of community gardens in the mid-west and their abilities to address local food insecurity. This group has focused on examining whether or not their own model of community gardening to end local food insecurity, shares features with other gardens that reduce short-term hunger and/or are able to dismantle the structures that keep food insecurity embedded among the poor. The results of our analyses are presented and suggestions made for the empowerment of food insecure communities to enhance their control over local food production, distribution, and consumption.

95 Jacqueline Salim

_Research Journey Through Computational Methods_

Author(s): Jacqueline Salim
Department: Computer Science
Faculty Mentor(s): Philippe Giabbanelli
Session Time: 10:15am - 11:30am

Cellular Automata (CA) models provide a grid-like visual representation of how states change over time. These changes are performed through ‘simulations’, that is, the act of running a model. In my research journey, I worked on CA in three different ways. First, I investigated their use to model obesity alongside other simulation techniques. My analysis (currently under review in a major journal) built a network of citations between simulation articles. While we may think that researchers who use simulations for the same problem would likely be aware of each other’s work (as evidence through citation), I instead found different communities. Second, I examined how to better visualize the data generated by CA. While CA were usually visualized using a slider to transition from one grid state to the next, Giabbanelli and Baniukiewicz proposed a new visualization software. Specifically, it uses a temporal clock glyph to show the successive states all within the same cell. I contributed to preparing the empirical evaluation of the software (through the video that was provided to all participants), and to the analysis of results (by extracting performance numbers from the participants’ videos). Overall, our team showed that participants felt much more confident in using the new visualization. Finally, I explored their applicability to procedurally generate terrain for video game maps. Mazes were represented as CA, through which virtual ‘rats’ would move in an attempt to exit the maze. Overall, my research, supervised by Dr. Giabbanelli, constituted an educational journey through the application of computational methods.
96  Brooke Gordon  
*Communicating about sports with peers: The role of sports talk in friendship maintenance*

Author(s): Brooke Gordon  
Department: Communication  
Faculty Mentor(s): Mary Henningsen  
Session Time: 11:30am - 12:45pm  

In the extant interpersonal communication literature, very little information exists on the role, nature, and content of peer communication about sports. In this study, the primary focus is to investigate the premise that sports talk is an important part of peer relationships. Relationship maintenance and teasing research, in general, inform the way in which the study was designed. The study seeks to understand differences in knowledgeability about sports among peers. Specifically, the study focuses on the importance of sports to the individual, the role of sports within the individual’s peer group, and sex differences in conversations about sports. A survey was conducted that included open-ended and closed-ended scales. The questions addressed the importance of sports in personal relationships, the communication indicators of sports knowledgeability, and the types of knowledge and information that are required to be considered knowledgeable about sports. A student sample was used in the study and the results will be discussed as they implicate gender differences, the definition of sports knowledgeability, and the role of sports talk in peer relationships.

97  Krissie Haddon  
*CGA Shape Grammars in European Castle Design*

Author(s): Krissie Haddon  
Department: Computer Science  
Faculty Mentor(s): Kirk Duffin  
Session Time: 10:15am - 11:30am  

Formal grammars are sets of rules that transform symbols into other symbols. They are used widely in the study of language. Shape grammars are an extension that transform shapes into new shapes. In our project, we are writing shape grammars and generation software inspired by Müller and Wonka’s CGA Shape software. The generation system reads the written rules and ultimately creates a scene which is put into a virtual world. We are using European castles as a test style because some of their features lend themselves nicely to investigate various aspects of the generation system. The development of an independent code base is revealing assumptions in the implementations given in the existing literature. The questions raised point to promising future research topics.

98  Zahra Muhsin  
*"Bad Kids:" Punitive Discipline and the Faces behind the Pipeline (Short Documentary)*

Author(s): Zahra Muhsin  
Department: English  
Faculty Mentor(s): Bradley Peters, Laura Vazquez  
Session Time: 12:45pm - 2:00pm  

This project will be a continuation of my research from last year involving the prison industrial complex and punitive discipline in schools. In last year’s research, I created a magazine that highlighted the major issues, consequences, and problems regarding punitive discipline. This online magazine tool was beneficial for presenting my research, and people were interested in learning more about this negative form of discipline that permeates schools in the United States. Despite evidence that crime rates among adolescents have been decreasing throughout the last few decades, suspensions, expulsions, and arrests have increased markedly with children and adolescents (Heitzeg 2009). This evidence suggests that the level of discipline being used does not serve a positive purpose or beneficial outcome. Last year’s research focused on the statistics and produced a clinical analysis of the problem. This year, the documentary will highlight students’ individual stories and professionals’ opinions about this issue. The United States imprisons five times more children than any other nation in the world and two-thirds, of kids incarcerated, never go back to school when released (Kids for Cash, 2014). These alarming statistics warrant an in-depth look. Perspectives shown in the documentary come from clinical and educational environments including viewpoints from teachers, students, and practitioners of law and mental health. Seeing the faces behind that statistics has the potential to move more people to activism regarding changing the juvenile and educational systems.
99  
Fermin Luna  
*Linguistic Gains During Short-Term Study Abroad: Examining the Role of Initial Proficiency*  

Author(s): Fermin Luna, Bernard Issa, Mandy Faretta-Stutenberg  
Department: Foreign Languages and Literatures  
Faculty Mentor(s): Mandy Faretta-Stutenberg  
Session Time: 10:15am - 11:30am  

The focus of this project is to determine whether or not second-language learners make significant linguistic gains during short-term study abroad programs. Today we see a ton of study-abroad programs, specifically short-term programs, that are popping up all over the nation but we do not really know if these experiences make a difference when it comes to learner proficiency. When people ask, What is the best way to acquire another language? most people typically say that studying in a different country is the most effective way; however, the results of empirical research are mixed. This particular project hones in on two groups of students participating in five-week study abroad programs in Spain designed for (a) beginning learners and (b) intermediate-advanced learners, respectively. Learner proficiency was measured using multiple metrics from learners during weeks one and five of their study-abroad programs. Data were examined in order to determine (a) whether learners made significant gains in proficiency during study abroad and (b) whether proficiency changes were related to pre-program proficiency in order to explore the linguistic impact of short-term study abroad programs and the role of initial proficiency and preparedness in linguistic gains during study abroad.

100  
Katy Voight  
*Aufseherin: Female German Nazi Camp Guards and Post-War Justice*  

Author(s): Katy Voight  
Department: History  
Faculty Mentor(s): Andy Bruno  
Session Time: 9:00am - 10:15am  

When the concentration camps were liberated upon the end of World War II, the entire world was shocked by the atrocities that occurred within the walls of the camps. Within the Nazi organization, both men and women played key roles in the perpetration of the genocide in and outside of the camps. While women could not legally be a part of the Schutzstaffel, a Nazi paramilitary organization, they were allowed to be auxiliaries and many worked as guards within the camps. This research focuses specifically on three female camp guards, all of which tell their own story about the camps and their role within the organization. I considered why these women chose to work in the camps, what roles they played within the camps, how they coped with working in the camps after the war, and what sort of justice they received for their crimes. These ordinary women became low-level perpetrators in an overarching systematic genocide and they offer a great microhistory of their extraordinary lives as female camp guards working in a major women’s concentration camp. Much like the men, everyday women were carrying out the atrocities of the Holocaust within the camps, and at the end of the war, justice was served accordingly. Straying away from telling the story from the victim’s perspective, this research specifically tells the stories from the perspective of the perpetrators themselves.

101  
Daria Porter  
*China: History and Culture*  

Author(s): Daria Porter  
Department: Foreign Languages and Literatures  
Faculty Mentor(s): Lan Hui Ryder  
Session Time: 10:15am - 11:30am  

In the summer of 2016, I attended two Chinese universities, the Chongqing University of Posts and Telecommunications and the Shanxi Agricultural University. My study abroad experience in China has not only shaped my understanding of myself but opened my eyes to the world of Eastern civilization.
Winter weather events such as snow and ice storms, and extreme cold air outbreaks produce major damages and large costs across many weather-sensitive sectors. Numerous studies have characterized snowstorms, their regional frequency, magnitude, and related impacts, and others have examined the cumulative role of snowfall and temperature anomalies for a specific month or winter. This study aims to examine a snowfall extreme at a different temporal scale, the greatest 30-day snowfall totals for areas in the United States east of the Rocky Mountains for the period 1900-2016. The initial task of such a study is to identify and map the long-term climate stations (i.e., those with daily snowfall records dating from 1900-2016) and then conduct an evaluation of snowfall records to determine those stations that need to be removed from the study. Once a final set of historic snowfall stations has been determined, the five heaviest independent 30-day snowfall periods (i.e., events) will be identified for each station. Temporal analyses of these events during the 1900-2016 period will be examined and described. The top five spatial coverage events (i.e., those five events with the greatest number of stations experiencing one of their top five heaviest 30-day snowfall events) will be identified, mapped and discussed. This evaluation of snowfall totals for periods greater than a storm and less than a winter would create a new and useful climatology.

Previous work done on sediment samples from under the Whillans Ice Stream (WIS) in West Antarctica indicated microbially-mediated chemical weathering likely occurring widely under the WIS. Feldspar minerals possess many more life-supporting nutrients than quartz and should serve as a better foundation for the microbially-mediated chemical weathering. This study identifies the abundance and composition of biogeochemical precipitation features on feldspar sand grains. Samples for this study come from three field sites; one near the end of the WIS (Subglacial Lake Whillans (SLW)) and the other two further up the flow path at sites called “UpB”. The abundance of distinctive precipitation features are described using a Scanning Electron Microscope and the chemical composition of the sample and precipitate are obtained using an energy-dispersive X-ray spectroscope (EDS). Data showed an increase in dark precipitation features at SLW and UpB sites suggest that the precipitation is pervasive underneath the WIS. EDS analysis of the precipitation features revealed that the precipitation features are made of carbon.

Light Detection and Ranging (LiDAR) has become a standard of accuracy in the creation of highly detailed maps due its high level of resolution. LiDAR units have historically been limited to large aerial platforms but this is changing with the development of small, lightweight units. This has opened up new areas that now are able to be scanned using a portable LiDAR unit. This increase in functionality and accessibility for users has been mirrored in developments of Photogrammetry, a spatial measurement process based on photographs. When these techniques are used in conjunction with each other 3D models of structures are able to be created to a level of detail that is not available by other methods. This project is based upon that ability. The focus of the project is to use LiDAR based data enhanced by Photogrammetry to map the exterior of selected buildings on the campus of Northern Illinois University and merge them with interiors scan of the same locations. The results of this project will be models that are able to be easily manipulated and displayable in multiple mediums and forms. This could be very useful in a variety of situations including response to emergency incidents, location management, and spatial cognition.
105 **Nicholas Ferry**  
*Modern sedimentary processes and deposits at the Kronebreen-Kongsvegen tidewater glacier front in Kongsfjorden, Svalbard, Norway*

Author(s): Nicholas Ferry  
Department: Geology and Environmental Geosciences  
Faculty Mentor(s): Ross Powell  
Session Time: 11:30am - 12:45pm

Part of the Svalbard Research Experience for Undergraduates (REU) project, was designed to quantify the modern sedimentary processes in the environment proximal to the Kronebreen-Kongsvegen subpolar tidewater glaciers that end in Kongsfjord, Svalbard, and relate those processes to sedimentary deposits. The purpose of this study is to first define the important processes that contribute to the stability of these glaciers relative to global warming. A second goal is to provide a geological template for interpreting sedimentary records of these polythermal glacimarine environments in order to assess responses of these glaciers to past global temperature changes. To achieve this goal a series of sediment gravity- and box-cores were collected from Kongsfjorden during the summer of 2014. Sedimentary facies were identified within these cores by describing color, particle size, primary and penecontemporaneous sedimentary structures, and contact types following standard sedimentological procedures. The lithofacies delineated using these data were related to the observed and quantitatively measured processes occurring in the fjord. The dominant depositional mechanisms in the fjord, included (i) turbidity currents and debris flows on the fjord floor as rapidly deposited sediment fails, (ii) settling of particles from suspension in sediment plumes flowing away from meltwater streams discharging from the glacier terminus, and (iii) iceberg rafting of coarse-grained sediment released from icebergs as they melt while floating away from the terminus after they are calved-off that ice face. We found that the processes and deposits are unique to these glacial systems and can be used to characterize them in older deposits to infer past glacier behavior. Furthermore, these sediments could potentially accumulate fast enough to help slow glacial retreat; however, they do not appear to be accomplishing that at present and the ice continues to be lost to global warming and contributes to rising sea levels.

106 **Tyechia Price**  
*The History of Leis in Hawaii during Pre-Colonial, Colonial and the Hawaiian Cultural Renaissance Eras*

Author(s): Tyechia Price  
Department: History  
Faculty Mentor(s): E. Taylor Atkins  
Session Time: 9:00am - 10:15am

Focusing on the history of Hawaiian leis during the pre-colonial, colonial, and Hawaiian Cultural Renaissance eras, this research showcases the significance of the lei in Hawaii and the changes of the lei meaning throughout the eighteenth to twentieth centuries. Prior to Western contact, during the pre-colonial era, Hawaiian culture and history was one of oral tradition, with the histories and stories of the people being told through hula, chants, storytelling and day to day living. Visually, the undeniable importance of leis as personal and tribal identification and elements of dress and storytelling threads itself alongside the oral tradition of this time. After Western contact and the emerging colonial era, the Hawaiian language was ban from usage, as was hula, resulting in the stories and histories of the people fading into distant memories of a kingdom that was slipping into foreign hands. The commercialization of leis, being sold on the streets, airports and on piers – a commodity for tourist, was a far cry from the once expressive meaning of tribal identification and visual significance they once held. The Hawaiian Cultural Renaissance, a time of refocusing on Hawaiian arts, culture, language, history and pride, brings back the histories of Hawaii, such as the lei, uniting a modern day history to its ancient roots.

107 **Keith Oehlsen**  
*The End of Serfdom in Russia - Крестьянская реформа 1861 года*

Author(s): Keith Oehlsen  
Department: History  
Faculty Mentor(s): Andy Bruno  
Session Time: 12:45pm - 2:00pm

Serfdom was an institutionalized form of slavery that determined the role of peasants born on owned land to be considered property of the landowner. It began to spread across Europe during the 13th century and lasted in some
countries as late as the 1800s, Russia was one such country. In 1861 Tsar Alexander ii signed the “1861 Emancipation Manifesto”, liberating more than 23 million people with the stroke of a pen. As serfdom had been an institution of the Russian Empire for hundreds of years up to this point, the process of this liberation was not a simple one. How did this massive societal change impact the serfs? What were the reasons for the Emancipation? How did the landowners and nobility feel about this? And why was Alexander ii assassinated by one of the very serfs he freed 20 years post Emancipation? Come to “The End of Serfdom in Russia - Крестьянская реформа 1861 года” poster presentation and find out!

108  Tyechia Price
    The Carat Empires

    Author(s): Tyechia Price
    Department: History
    Faculty Mentor(s): Anne Hanley
    Session Time: 10:15am - 11:30am

Brazil has a long Atlantic economic history, linking it to other European countries. One area of this history is the gemological and mining history. This area is grossly understudied as a way to look at the connect of Brazil to Europe through economy, the prospering of Brazil as a country and the changing of gemological value of the gemstones mined in Brazil. This research looks at the gemological impact Brazil has had on the trade, the economic impact it has had on its economy and the connection to Europe through gemology.

109  Shadrick Mead
    Congressional Funding For the Department of Veterans Affairs: Effects of Partisanship and Veteran Status

    Author(s): Shadrick Mead
    Department: Political Science
    Faculty Mentor(s): Scot Schraufnagel
    Session Time: 9:00am - 10:15am

Republicans have been the party of veterans since the civil war. Do they still remain loyal to this group of constituents, or has the VA become a bipartisan issue? Veterans after WWll made up seventy percent of congress, now they control less than seven percent. Does the decrease in veteran representation have a major effect on additional budgeting for the VA? The purpose of this project is to determine the implications of partisanship, and number of veterans within congress, on budget allocations for the Department of Veterans Affairs. Veterans are seen as exemplary members of the United States; as such this project seeks to determine if a certain party majority has any effect on VA budget allocations, or whether a lesser degree of veterans in congress also has an effect.

110  Paula Moraga
    X-ray Study of the Location of Sulfonated Cholesterol in Membranes

    Author(s): Paula Moraga
    Department: Physics
    Faculty Mentor(s): Laurence Lurio
    Session Time: 10:15am - 11:30am

This research project involves analyzing how the properties of phospholipid bilayer membranes, a model system for Eukaryotic cell membrane, are modified by the addition of cholesterol sulfate. This will be done by forming an artificial cell membrane on a silicon substrate by using the Langmuir-Blodgett method for depositing two phospholipid monolayers on top of each other. This sample will then be analyzed using an x-ray reflectometer. The data collected from these scans will be analyzed in order to see the changes in density and roughness. The idea is to specifically identify the position of the cholesterol sulfate in the membrane.
111 Sandra Puebla
Operation Wetback: The 1950s Deportations in Chicago

Author(s): Sandra Puebla
Department: History
Faculty Mentor(s): Beatrix Hoffman
Session Time: 11:30am - 12:45pm

This project will explore the 1954 deportation operation called “Operation Wetback”. Operation Wetback was an operation under the Immigration and Naturalization Service that deported an estimated 700,000 people of Mexican descent, mostly without due process. There have been very few studies of Operation Wetback, especially in Chicago, and much of its history still needs to be written. The history of Operation Wetback is important to understanding debates over immigration today.

112 Austin Sundstrom
When Heaven met the Earth: Tunguska Event

Author(s): Austin Sundstrom
Department: History
Faculty Mentor(s): Andy Bruno
Session Time: 12:45pm - 2:00pm

My objective is to research English sources on the Tunguska event, which occurred in 1908 over Siberia flattening a large portion of the land and was not properly researched until the 1920/30’s, and again in the 1950’s, which is also when the conspiracy theories about the event started to come out. I expect to not find many articles about the event until the 1920’s when the Soviet research began and even then they might be sparse until the 1950’s when more research on the event was conducted. Upon research, I have found that for many of the years following the explosion there was little talk of the event, but when it was spoken of, the cause of the explosion was attributed to a comet or meteorite. The 1960’s and beyond marked the arrival of conspiracies; articles began to talk of alien civilizations, antimatter, and blackholes. The articles then shifted as support for the idea for a defense system against rogue meteorites that could destroy a planet with Tunguska being an example for why such systems are needed in the 1990’s. From the 1990s and on, the theories about Tunguska are mostly conclusive with a comet or meteorite being the generally accepted (and most talked about) cause of the event.

113 Dayne Coveyou
Characterization of SiPMs for the CRV of Mu2e

Author(s): Dayne Coveyou
Department: Physics
Faculty Mentor(s): Gerald Blazey
Session Time: 10:15am - 11:30am

The Mu2e experiment will study CP violation through observation of muon decay to an electron that would indicate new physics beyond the Standard Model. The Cosmic Ray Veto (CRV) prevents contamination of the sensitive data Mu2e collects from outside sources of radiation. Silicon Photo Multipliers (SiPMs) are an integral part of the CRV detector, collecting background noise from cosmic rays and beam interactions and eliminating the cosmic ray signal from Mu2e data. SiPMs detect single photons of light and must work within a narrow range to be deemed acceptable for Mu2e. This research will focus on SiPM stability as well as developing custom software and new, efficient testing methods; all of which are essential for essential for maintaining experimental sensitivity.

114 Ala Dynak
Trump: The Impact on U.S. House Races

Author(s): Ala Dynak
Department: Political Science
Faculty Mentor(s): Scot Schraufnagel
Session Time: 9:00am - 10:15am

This project looked to uncover whether the nomination of Donald Trump as a presidential candidate for the Republican party influenced positively or negatively the percentage of votes of House Republican members. The phenomenon is
identified as a ‘presidential coattail’ effect. It occurs when the voter’s choice of a candidate for a major office—presidency, influences the voters’ final choice for a minor office—House of Representatives. Some Republican House members showed full support for the Trump campaign whereas others have publicly refused to endorse him. In this project I am testing whether a coattail effect took place despite the fact that Trump has been identified as an unusual candidate who did not conform with many Republican Party principles. After analyzing all possible cases from the 2016 election, results show that Trump did in fact have coattails. Those GOP House members who supported him the most picked an additional three percentage points of support, on average.

115  Jesse Ercolani  
_A Comparison of Pagan Burials and their Symbolism_  

Author(s): Jesse Ercolani  
Department: Medieval Studies  
Faculty Mentor(s): Susan Deskins Valerie Garver  
Session Time: 11:30am - 12:45pm

The objective of this project is to show the similarities between the Anglo-Saxons, Merovingians and the Vikings in respect to their pre-Christian religion. This is accomplished using the similarities of their burial customs, mainly regarding their use of grave goods. The similar funerary types, mainly cremation between the Anglo-Saxons and the Vikings and inhumations by the Anglo-Saxons and Merovingians, show a common trait between the three groups. The categories of grave goods were also similar for each group. For example, common accessories were food vessels found in different positions and common animals were cattle and sheep. Another similarity that can be inferred from this is the symbolism, religious and social, attached to the graves, which when observed over all three groups can show similarities in their religion. This is important for the Anglo-Saxons due to no written information on their pre-Christian religion.

116  Brennen Dziadon  
_The Limits of Liberal Optimism: Constraints and Prospects of a Commercial Peace_  

Author(s): Brennen Dziadon  
Department: Political Science  
Faculty Mentor(s): Andrea Radasanu  
Session Time: 12:45pm - 2:00pm

The expansion of commerce has had a tremendous impact on the evolution of the global political reality. To Montesquieu, the rise of commerce offers a promising alternative to traditional means of competition amongst states, such as war. Though not expected to bring about a strong, lasting peace, increase in commercial activity has great potential to diminish the frequency and severity of militarized international disputes through the proliferation of peaceful mores and the development of mutual dependency. The management of commercial growth may be examined as a question of utility. To be more specific, it is a consideration of marginal utility. Montesquieu emphasizes the fact that states are inherently competitive, and that commerce is simply one manner in which states compete with one another. Commerce, then, becomes an advantageous tool only inasmuch as it remains a more efficient input relative to other means of competing. My research will emphasize varying returns to scale of commercial power over time by dyadic comparison across recognized states in the international system from 1960-2009 and the effects this has on international relations. The ultimate goal of this research is to construct a multivariate descriptive model which best specifies the relationship between trade flows, productivity, national material capability, and the likelihood two states will engage in a militarized interstate dispute in a given dyad year.

117  Nicholas Casas*  
_ Identifying Predictors of Congressional Incivility: An Individual-Level Analysis_  

Author(s): Nicholas Casas  
Department: Political Science  
Faculty Mentor(s): Scot Schraufnagel  
Session Time: 10:15am - 11:30am

This research explores what background characteristics are more closely associated with uncivil acts by members of Congress, while serving in Congress. Put differently, the research seeks to identify biographical attributes that predict uncivil member behavior. The time period of the study is the 45th (1877-78) through the 113th Congress (2013-14). Each implicated member is compared, randomly, with another member from their political party, their chamber, and
their Congress, holding constant these factors as possible explanations for uncivil acts. Independent variables tested include: legal education and experience, judicial experience, state legislature experience, ideological alignment, congressional leadership, being the chair of a standing committee, and gender. The analysis suggests both leadership roles, state legislative experience, and gender associate with civility in the hypothesized manner. However, the test of legal background confirms the null hypothesis, there is no statistically significant difference between those implicated and their matched pair.

118 Aaron Ford
Second Guessing Test Answers is a Bad Thing?

Author(s): Aaron Ford Alexia Kingzette Anna Snyder David Valentiner
Department: Psychology
Faculty Mentor(s): David Valentiner
Session Time: 11:30am - 12:45pm

Safety behaviors are a consequence of anxiety. The “Reassurance Seeking” safety behaviors scale includes some statements like “I need to review my answers more than once before I turn in an exam, or else my grade will be worse.” Safety behaviors may lead to lower exam performance. One would expect that double-checking answers would increase the likelihood of getting a better grade. In some cases, reviewing answers too many times can cause someone to perform worse than they would have. A study was performed on an introductory to psychology class. All students are undergraduates (N=59; 54% male; 61% White). The class was based on three non-cumulative exams. Students were brought into a room to take a 10-item Test-Related Reassurance Seeking Scale (alpha = .66; Knoll et al., in press) and a 5-item test anxiety scale (alpha = .92; Taylor & Deane, 2002) after they received their second exam score. Two researchers viewed the scantrons, from exam three, of the students to note any erase marks, spoiled answers, irrelevant answers, or corrected answers separately. Disagreement was settled via mutual agreement. Our study tested whether reassurance seeking behaviors would predict spoiled answers (r = .30, one-tailed p = .016). As believed reassurance seeking has a strong connection with test anxiety (r =.41, p < .001). Reassurance seeking behaviors appear to have a strong positive connection with spoiled answers. Double-checking answers might not be the best approach for everyone.

119 Adam McNeela
Effects of target ASO therapy on markers of cholinergic function on Usher Syndrome mice

Author(s): Adam McNeela, Tia Donaldson, Kelsey Jennings, Lucia Cherep, Frederic Depreux, Michelle Hastings, Douglas Wallace
Department: Psychology
Faculty Mentor(s): Douglas Wallace
Session Time: 12:45pm - 2:00pm

Usher syndrome is an autosomal recessive genetic disorder that is associated with impaired visual, auditory and vestibular function. Previous studies have suggested that the vestibular system is important for self-movement cue processing and has an influence on hippocampal formation cholinergic function. Recent work has demonstrated that antisense oligonucleotide (ASO) therapy can attenuate behavioral and electrophysiological deficits associated with a mouse model of Usher syndrome; however, it remains to be determined whether Usher syndrome and ASO therapy influence hippocampal formation function. The current study investigates the relationship between hippocampal cholinergic function and ASO therapy in a mouse model of Usher syndrome. Heterozygous and mutant Usher mice received intraperitoneal injections of ASO or control treatment at postnatal day five. All mice were then tested in an exploration task at two and six months of age. Subsequent to the six month testing all mice were sacrificed and coronal sections at the level of the temporal hippocampus were stained for acetylcholinesterase (AChE) a marker of cholinergic function. Optical densities were calculated for several hippocampal and cortical areas. No differences in AChE optical densities were observed between Usher and control mice. In contrast, significant increases in AChE optical density were observed in the several hippocampal regions in ASO treated Usher mice relative to the other groups. These results demonstrate that ASO therapy influences hippocampal function in an Usher mouse model and has implications for understanding neuropathology associated with genetic disorders.
120  Aidan Osterby
Speak Up Charlie Brown: The Relative Roles of Text and Images in Processing Comics

Author(s): Aidan Osterby, Joseph Magliano, Neil Cohn
Department: Psychology
Faculty Mentor(s): Joseph Magliano
Session Time: 9:00am - 10:15am

Narratives involve characters that we automatically track the internal states of (Magliano, Taylor, & Kim 2005). But while there is a large body of research revolving around the tracking of internal states in text comprehension, there is very little on the how this is done in comics, where both images and text information are present. The present study explores the relative roles of visual and linguistic modalities in the construction of the mental model. Participants were shown comic strips that have only the dialogue present, the images present, or both. They were then presented with a textless final panel with a character showing an affective release. Viewing times of the final panel were recorded as well as judgements on coherence and enjoyability of the comics. Three competing hypotheses were proposed. Image dominance stated that viewing times would be fastest when images were present, text dominance stated that viewing times would be fastest when text was present, and dual contributions stated that viewing time would be fastest when both were present. Interestingly, while viewing times supported the image dominance hypothesis, judgements of both coherence and enjoyability were highest in the full context conditions, with no significant different between the image only and text only conditions.

121  Soriano Carolina, Jared Johnson
Prestige of Mentor: Effects on Mentee’s Job-Related Attitudes and Performance

Author(s): Soriano Carolina, Courtney Thomas, Jasmin Martinez
Department: Psychology
Faculty Mentor(s): Lisa Finkelstein
Session Time: 11:30am - 12:45pm

Literature on mentor-mentee relationships has explored many individual differences and interpersonal interactions. For example, Allen (2004) found that individual differences in ability and willingness to learn affected mentor willingness to pick a mentee. Furthermore, differences among the formality of mentor-mentee relationship (e.g., formal mentor, supervisor, co-worker, etc.) have demonstrated stronger mentee outcomes (e.g., job satisfaction, organizational commitment, turnover intent) for informal mentorships as opposed to formal mentorships (Raabe & Beehr, 2003). Darling et al. (2006) investigated how individual differences such as gender, ethnicity, and age impact the mentor-mentee relationship. They concluded that these individual characteristics modify the needs of mentees and emphasize the importance of mentorship fit. Our study will examine yet another variable in the mentoring relationships: a mentor’s perceived prestige. This study asks the question: how does the perceived prestige of a mentor impact the attitudes and potential behaviors of a mentee in the workplace? Specifically, we would like to know how perceived mentor prestige impacts mentee engagement, motivation, job satisfaction, organizational citizenship behaviors, and organizational identification. To this end, we are conducting a preliminary study to examine the effects of perceived mentor (educational) prestige on student self-reported attitudes through an online survey format. These results will provide a basis for future studies conducted in more realistic workplace settings.

122  Alexia Kingzette
The Impact of Test Anxiety on Academic Outcomes

Author(s): Alexia Kingzette, Aaron Ford, Anna Snyder, David Valentiner
Department: Psychology
Faculty Mentor(s): David Valentiner
Session Time: 12:45pm - 2:00pm

Exams are used in almost every academic and career field to compare one individual to another. Test anxiety is a common problem that interrupts an individual’s ability to perform on an evaluative task. Reassurance seeking and cognitive test anxiety (CTA) are two inventories that have been found to be highly sensitive of measuring test anxiety, therefore these scales were the focus of this study. The Test Anxiety Inventory (TAI) was included as a baseline scale. This study examined whether reassurance seeking and cognitive test anxiety predict past and current academic outcomes using a sample of undergraduate students enrolled in Introduction to Psychology (N = 59). The Cognitive Test Anxiety (CTA) was found to predict test outcomes after controlling for non-test outcomes. The CTA also predicted ACT
scores after controlling for high school GPA. While the reassurance seeking scale predicted ACT scores, but not test outcomes in the Psychology course. These results provide some evidence that treatment for test anxiety might target cognitive test anxiety, and perhaps reassurance seeking.

123  Arbnora Hadji, Urvi Patel, Abigail Perillo, Norberto Cisneros Jr.
Do Parents’ Beliefs Mediate the Relationship Between Socioeconomic Status and Parent Involvement for Kindergarten Students?

Author(s): Arbnora Hadji, Urvi Patel, Abigail Perillo, Norberto Cisneros Jr.
Department: Psychology
Faculty Mentor(s): Julia Ogg, Laura Seimetz
Session Time: 9:00am - 10:15am

Previous research suggests that higher socioeconomic status (SES) is related to higher levels of parent involvement in education (Grolnick, Benjet, Kuerwowski, & Apolosoleris, 1997). However, parents’ beliefs about their involvement play a role as well; parent beliefs such as role construction, self-efficacy, knowledge and skills, and time and energy are believed to impact parent involvement behaviors (Green, Walker, Hoover-Dempsey, & Sandler, 2007). Parents who believe that it is their responsibility to be involved are more involved in their child’s education at school and at home (Hoover-Dempsey et al., 2005). Past research suggests that working class parents are more likely to believe that it is their role to make sure their child is prepared to learn (teaching good manners and getting them to school), while upper-middle class parents tend to work with the school and often intervene in decisions (Hoover-Dempsey & Sandler, 1997). In addition, working class parents may leave decisions to the school because they believe that is not their responsibility (Hoover-Dempsey & Sandler, 1997). These findings have led researchers to propose that SES factors are indirectly related to parent involvement through parent beliefs (Davis-Kean, 2005; Hoover-Dempsey et al., 2005). In other words, there is evidence that the impact of SES on parent involvement varies depending on beliefs parents hold about their roles, knowledge, and abilities. The purpose of this study is to examine whether the effect of SES on parent involvement is mediated by parental beliefs (i.e. role contraction, self-efficacy, knowledge and skills, time and energy).

124  Jacinta Anyanwu
Intervention that will result in Lower Levels of Shyness Mindset: Effects on Probability Estimate, Cost Estimate, Avoidant Strategy, and Social Anxiety Distress

Author(s): Jacinta Anyanwu, Amber Chamberlain, Benjamin Darnell, David Valentiner
Department: Psychology
Faculty Mentor(s): David Valentiner
Session Time: 11:30am - 12:45pm

This study examined individuals’ beliefs about the fixed nature of their shyness in social situation and an intervention that will result in a lower level of shyness mindset. Individuals with fixed shyness mindset believe that their shyness level is non-malleable. They tend to overestimate severity of threatening events, and the consequences of the events would be overwhelming. They are highly distressed in social environment and result to avoidance as a coping tool for their erroneous perceptions. There has been limited research concerning intervention for individuals with fixed shyness mindset who are equally high in social anxiety. Fifty-one introductory psychology students, selected based on prescreening for fixed shyness mindset and high social anxiety, were randomly assigned to complete a shyness mindset intervention or a control condition. They then completed measures of shyness mindset, probability estimates, cost estimates, avoidant strategies and social anxiety and distress. The result showed that there was significant effect of condition on shyness mindset. Intervention did not result in lower level of probability estimates, cost estimates, avoidant strategies and social anxiety and distress. These findings suggest that the intervention may not produce immediate changes. Further research focused on long-term effect is advised.

125  Jocelyn Zambrano*
The Effect of Parent Involvement in Education on a Child’s Emotion Regulation

Author(s): Jocelyn Zambrano
Department: Psychology
Faculty Mentor(s): Julia Ogg
Session Time: 12:45pm - 2:00pm

The purpose of this study includes two aims: 1.) Examine the link between parent’s involvement in education and children’s emotion regulation. 2.) Determine if parent involvement in education predicts emotion regulation above and
beyond general parenting practices. Emotion regulation is a combination of cognitive, physiological, and behavioral skills that allow for preventing, lessening the effects of, and manipulating the presentation of one’s emotion and responses (Cole, Michel, & Teti, 1994; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Thompson 1994; Berkovits, Eisenhower, & Blacher, 2017). Emotion regulation has been shown to promote academic excellence (Tentrastra & Izard, 2007). Parent involvement in their child’s education, which includes: (1) parent involvement at home, (2) parent involvement at school, and (3) school-home communication (Fantuzzo et. al., 1999) has also been associated enhanced academic achievement (Hill & Tyson, 2009). In considering the links between parental involvement in education and emotion regulation, very little is known. Although, general positive parenting practice, like using praise, have shown to support emotion regulation (Assor, Niemiec, Ryan, & Deci, 2009; Garner, 2006), it is unclear if parent’s involvement in their child’s education also links to emotion regulation. Thus, the purpose of this study is to examine the relationship between parent involvement in education and children’s emotion regulation. In addition, this study will examine if parent involvement in education predicts emotion regulation once general parenting practices are taken into account. These findings could identify a potential area for intervention that could be used to improve student’s outcomes.

126 Ethan Hoffman®

**Relationship between Sexual Abuse, Problem Drinking, and PTSD**

Author(s): Ethan Hoffman, Anthony Reffi, Holly Orcutt
Department: Psychology
Faculty Mentor(s): Holly Orcutt
Session Time: 10:15am - 11:30am

Sexual abuse in adolescents is an increasingly growing problem in the United States, with 9.1% out of the 3.4 million reported referrals to child protective services pertaining to sexual abuse. Studies over many decades have shown that individuals with a history of sexual abuse are at risk for posttraumatic stress disorder (PTSD). PTSD has been defined as “a mental health condition that’s triggered by a terrifying event — either experiencing it or witnessing it”. The current study investigated the potential role of lifetime alcohol use in mediating the relationship between adolescent sexual abuse and PTSD symptoms. More specifically, we expected that individuals with a history of adolescent sexual abuse will engage in a higher frequency of lifetime alcohol consumption, leading to greater PTSD symptoms. Contrary to predictions, lifetime alcohol use did not mediate the relationship between adolescent sexual abuse and PTSD symptoms. Study limitations and future research directions are discussed.

127 Sana Asif, Kylie Reed, Warda Naqvi, Nadine Brokhof

**How do Invitations from Schools, Teachers, and Children Predict Parent Involvement and Academic Achievement?**

Author(s): Sana Asif, Kylie Reed, Warda Naqvi, Nadine Brokhof
Department: Psychology
Faculty Mentor(s): Julia Ogg, Katelynn Gohr
Session Time: 11:30am - 12:45pm

Research demonstrates that parental involvement positively affects children’s achievement (Reed, Jones, Walker, & Hoover-Dempsey, 2000). Therefore, it is important that schools engage in efforts to encourage parent involvement such as inviting parents through general and specific invitations (Hoover-Dempsey & Sandler, 1995; 1997). Hoover-Dempsey and Sandler (1997) found that parents are more likely to become involved when the teacher makes specific invitations for parents to visit the classroom and assigns homework involving parents. In addition, child invitations predict home-based involvement, while both teacher and child invitations predict school-based involvement (Deslandes & Bartrand, 2005; Green, Walker, Hoover-Dempsey, & Sandler, 2007). However, other research has shown that teacher invitations are also strong predictors of school and home involvement (Anderson & Minke, 2007). Additionally, general invitations from the school suggest to parents that their involvement is welcome, valued, and expected, which may impact parents’ levels of involvement (Hoover-Dempsey et al., 2005). Overall, the research is not consistent in specifying which types of invitations are most effective for involving parents in their child’s education. There is still additional research to be done about how invitations relate to different forms of involvement at home or school. The purpose of our study is to examine how parents’ perceptions of invitations from children, teachers, and schools relate to parental involvement, and in turn, how parent involvement might be related to students’ academic achievement.
128  Sonia Duran, Kelly Dorris
The Slippery Slope of Stroke Recovery: Effects of Anti-NOGO-A 11C7 Immunotherapy on Performance in a Ladder Rung Walking Task Following Unilateral MCAO

Author(s): Sonia Duran, Philip Blankenship, Ashley Blackwell, Shi-Yen Tsai, Gwendolyn Kartje, Douglas Wallace
Department: Psychology
Faculty Mentor(s): Douglas Wallace
Session Time: 9:00am - 10:15am

Strokes are known to have detrimental effects ranging from disruptions in gross locomotor coordination to deficits in cognitive function. Current therapeutic strategies are minimally effective and rarely generalize across cases. Recent work has explored the use of immunotherapy as a means of promoting functional recovery following stroke. Specifically, anti-NOGO-A immunotherapy (11C7) has been shown to increase forelimb coordination following stroke during a skilled reaching task. The current study seeks to extend these findings by examining the effects of 11C7 following unilateral middle cerebral artery occlusion (MCAO) on performance during a ladder rung walking task. Assessment of performance included latency to cross the ladder, number of limb slips, and limb misplacements. Pre- and post-treatment performance was compared to examine the effects of 11C7 on locomotor coordination. Currently, data collection is ongoing; however, these data may provide foundational evidence for the use of immunotherapy in promoting stroke-related recovery of function. The use of immunotherapy as a treatment for stroke in rodent models may suggest the possibility of similar effects in human stroke patients. Future work should seek to extend the use of immunotherapy as a post-stroke treatment in humans.

129  Stephanie Del Rosario, Jocelyn Zambrano, Aarika Nieto
The Mediating Effects of Parental Expectations on Child Academic Achievement

Author(s): Stephanie Del Rosario, Jocelyn Zambrano, Aarika Nieto
Department: Psychology
Faculty Mentor(s): Julia Ogg
Session Time: 11:30am - 12:45pm

Extant research suggests that early academic achievement is linked to positive outcomes in a child’s later academic career (Briley, Harden, & Tucker-Drob, 2014; Taylor, Clayton, & Rowley, 2004). One predictor of children’s early academic achievement is their parent’s obtained level of education, as there is a positive correlation between parents’ education levels and their children’s academic success (Davis-Kean, 2005; Taylor, Clayton, & Rowley, 2004). Specifically, the mother’s education level is positively correlated with her child’s initial reading skills in kindergarten (Howe, Lawlor, & Propper, 2013; Tang, Davis-Kean, Chen, & Sexton, 2014). One mechanism by which parent education level influences child achievement is through higher parental expectations for their child’s educational attainment (Briley et al., 2014). In fact, parent expectations are a stronger predictor of children’s academic achievement than parent’s level of education, this may be due to the child internalizing these expectations (Briley et al., 2014). While past studies have concluded that parent education level and childhood success in school are positively correlated, fewer have considered how parental expectations may mediate this association. The goal of our study is to replicate the findings of Briley et al. (2014) and further evaluate the effects of parental education on kindergartner’s achievement and whether this relationship is mediated by parents’ educational aspirations for their children. This is an important area of research because parents’ aspirations for their children may be a malleable target of intervention.

130  James Mogan
The Effect of Memory Load on Argument Recall

Author(s): James Mogan
Department: Psychology
Faculty Mentor(s): Anne Britt
Session Time: 12:45pm - 2:00pm

Arguments are everywhere but even college students do not always evaluate them accurately. Britt et al. (2008) found that college students often inaccurately recalled argument predicates by substituting different terms, including oversimplified replacements called ‘gist representations’ (i.e. ‘is immoral’ becomes ‘is bad’). Agreement judgement focus readers on their belief regarding the claims and quality judgement focus readers on the claim-reason connection (Wolfe & Britt, 2008). Therefore, in agreement judgements, one’s personal beliefs will be activated and can interfere with precise memory for the claim. In contrast, in quality judgements, one’s personal beliefs should be inhibited to
make the judgement and will be less likely to interfere with precise memory for the claim. The current study will assess whether increased memory demands will lead to increased inaccurate recall, including gist representations. Participants will judge 48 simple arguments in one of two conditions: 1) the agreement condition in which participants rate how much they agree/disagree with the argument, or 2) the quality condition, where participants rate the structure of the argument (flawed/excellent). Participants must hold a four-digit randomized number in memory while judging the argument (memory load condition) for half the arguments. We hypothesize higher recall in the quality condition compared to the judgment condition. Moreover, memory requires attention and therefore, memory load should decrease accurate recall for arguments in both conditions. This study demonstrates the importance of inhibiting one’s personal beliefs when evaluating and remembering arguments, a quality not only important in academia, but throughout our everyday lives.

131  Lori Drendel, Nicholas Hahn  
*Turning the Tide: Effect of Anti-NOGO-A Immunotherapy on Performance in a Morris Water Task Following MCAO*

Author(s): Lori Drendel, Philip Blankenship, Ashley Blackwell, Shi-Yen Tsai, Gwendolyn Kartje, Douglas Wallace  
Department: Psychology  
Faculty Mentor(s): Douglas Wallace  
Session Time: 9:00am - 10:15am

Stroke is a leading cause of debilitating impairments involving motor and cognitive function. Current stroke therapies including rehabilitative strategies, such as physical therapy, are limited in their success rates and rarely generalize across cases. Rodent models have been a critical tool in examining the effectiveness of novel therapeutic interventions. The Morris water task (MWT) has been used extensively as an assessment of spatial memory and cognitive functioning. Recent research has provided evidence that anti-NOGO-A immunotherapy (11C7) increases neuroplasticity throughout the central nervous system and has been shown to produce functional recovery in a skilled reaching task following stroke. The current study examines the effects of 11C7 on MWT performance following middle cerebral arterial occlusions (MCAO). Learning the location of hidden escape platform was assessed by calculating the time to reach the platform, heading error, and complexity of the swimming path. Although data collection for this study is ongoing, these results may provide evidence for the effectiveness of anti-NOGO-A immunotherapy in promoting recovery of cognitive functioning following a model of stroke in rodents. This experiment establishes a foundation that may translate to a novel therapeutic outcome for humans suffering from cognitive deficits associated with stroke.

132  Shannon Dudzienski, Elora Voyles  
*Which is Better: Positive or Negative Humor*

Author(s): Shannon Dudzienski  
Department: Psychology  
Faculty Mentor(s): Lisa Finkelstein  
Session Time: 11:30am - 12:45pm

This study examines how supervisors’ use of humor while giving positive and negative feedback influences task performance. Participants were given a work scenario in which their supervisor requested completion of a work task that required memorization of 20 words. On the following page of the online survey, participants typed the words that they could remember. After completion of the task, participants received feedback in the form of an email response from the supervisor. Based on the experimental conditions, each participant was presented with an email containing one of the four types of supervisor feedback: humorous positive feedback, humorous negative feedback, control positive feedback, and control negative feedback. In the humorous positive feedback condition, the supervisor said, “I’ve reviewed your performance and you scored quite well- that’s great. Some people have the memory capacity of an elephant.” And in the humorous negative feedback condition, the supervisor said, “I’ve reviewed your performance and you didn’t score that well- that’s too bad. It’s okay some people have memory capacity of a goldfish”. To determine the effects of supervisors using humor, participants’ performance on a second memory task will be compared to the type of feedback received. We predict that participants who receive positive feedback will perform better than participants who receive negative feedback. Performance differences between the feedback conditions will increase with the inclusion of humor. The results of this study will provide information to help improve performance and relationships between supervisors and workers.
**133 Karissa Kimes, Mohammed Akhtar**  
*Adolescents’ Resource Control Strategies and Perceived Social Support*

Author(s): Karissa Kimes, Kelly Clark, Nicole Dorio, Christine Malecki, Michelle Demaray  
Department: Psychology  
Faculty Mentor(s): Christine Malecki, Michelle Demaray  
Session Time: 12:45pm - 2:00pm

Resource control theory explores how individuals compete for material and social resources in social interactions (Hawley, 1999). Prosocial resource control strategies are ways in which children control resources while also benefitting others, while coercive resource control strategies are ways children control resources at the cost of others (Hawley, 2002). Adolescents’ general prosocial behavior has been found to be positively associated with parental and peer support (Wentzel & Mcnamara, 1999), but more research is needed to examine these associations with various types of prosocial behaviors and the intention behind those behaviors. The purpose of the current study was to group individuals based on their use of resource control strategies using latent profile analysis, as well as to examine group level differences of perceived social support, gender, and grade level among these groups. It was predicted that prosocial resource controllers would report high levels of perceived social support (Wentzel & Mcnamara, 1999) and bistrategic controllers (students high in both prosocial and coercive strategies) would show similar levels of perceived social support. The sample for this study included approximately 700 students from a suburban middle school in the Midwest. Self-report measures were utilized to assess the variables of interest. The Resource Control Strategies Inventory (Hawley, 2006) was used to measure resource control strategies of the students, and the Child and Adolescent Social Support Scale (Malecki, Demaray, & Elliot, 2000) was used to measure perceived social support. Results will be shared along with a discussion of implications for psychologists working with students in schools.

**134 Miranda Cox, SEF**  
*Preventing the Negative Effects of Social Isolation Stress with Environmental Enrichment in an Animal Model*

Author(s): Miranda Cox, William Colburn, Ashley Dagner, Neal McNeal, Marigny Normann, Joshua Wardwell W. Tang Watanaasriyakul, Angela Grippo  
Department: Psychology  
Faculty Mentor(s): Angela Grippo  
Session Time: 10:15am - 11:30am

Social stress, such as isolation or loneliness, has detrimental effects on behavior and cardiovascular function, possibly leading to depression and heart disease. Heart disease is the leading cause of death in the United States with 610,000 people dying each year, and depression is one of the most common psychological disorders worldwide. However, environmental enrichment (EE) may prevent the negative effects of social stress. EE involves physical exercise and interactions with inanimate objects that enhances neurogenesis, promoting the growth of new cells in the brain. This project examined the ability of EE to prevent the negative effects of social isolation stress on the cardiovascular system, mood, and the brain using a prairie vole model. Prairie voles have a social structure similar to humans, including forming long-term social bonds and engaging in biparental care. Prairie voles were housed with a sibling or partner, or socially isolated in a standard cage, a cage with an exercise wheel, or a cage with EE. Isolated prairie voles with EE showed lower levels of depressive behavior versus isolated prairie voles in a standard cage. They also showed reduced heart rate and increased heart rate variability, indicating improved cardiovascular function. Follow-up investigations are expected to reveal isolated prairie voles in the exercise and EE conditions demonstrate reduced activity in the hypothalamic paraventricular nucleus compared to the control groups, which is a brain region important for responding and adapting to prolonged stress. This research is important for understanding neurobiological mechanisms underlying stress responses in humans.

**135 Phoebe Xoxakos, SEF, Kathryn R. Klement**  
*The Battle of the Sexes: Are Abortion Attitudes Contingent on Gender or Sexism?*

Author(s): Phoebe Xoxakos, Kathryn R. Klement, Brad J. Sagarin  
Department: Psychology  
Faculty Mentor(s): Brad Sagarin  
Session Time: 11:30am - 12:45pm

Abortion, currently and throughout history, is a wide-spread controversial topic, though one in three women will obtain abortion services by the time they are 45 (Guttmacher Institute, 2014). Even after the U.S. Supreme Court affirmed a
woman’s right to undergo an abortion in the Roe vs. Wade (1973) case, state-wide laws and restrictions continue to be placed on abortion practices (Begun & Walls, 2014). Many Americans support and/or oppose the act of having an abortion based on their personal beliefs and attitudes on how women should conduct themselves in different situations, and Wolf (1991) points out that advocates on both sides of the issue respect human life, though in different ways. According to Livingston (2007), several factors relate to abortion attitudes: religion, gender role attitudes and political affiliation. However, less is known about what psychological constructs are involved in how abortion attitudes are formed. In a preliminary study, we found that abortion attitudes are significantly correlated with negative attitudes and beliefs about women. The current project was designed to determine how abortion attitudes relate to individuals’ perceptions of gender and sexism. In Study 1, we found that participants rated any woman, regardless of race, who aborted a pregnancy resulting from consensual sex as significantly less competent and less warm than all other conditions. In Study 2, we did not find a lot of evidence that abortion attitudes are related to biological functions (i.e., childbirth), which indicates they may be rooted in perceptions of women instead.

136 Andre Cochran

*Is reading a painting the same as reading a text?*

**Author(s):** Andre Cochran, Christian Steciuch  
**Department:** Psychology  
**Faculty Mentor(s):** Keith Millis  
**Session Time:** 12:45pm - 2:00pm

Recent theoretical research has proposed that understanding discourse and visual artwork share mental processes referred to as trans-symbolic comprehension processes (TSCP). Examples of TSCP are making inferences among explicit content, and activating relevant background knowledge. The present study sought to answer three separate research questions. The first question sought to provide evidence of TSCP by having participants view and read artworks and short written fables. In particular, we were interested in whether the patterns of TSCP were similar for artworks and texts. The second question addressed whether the different types of TSCP correlate with one’s aesthetic responses as indicated by ratings of enjoyment, interest, and understanding, and whether the association depends on the media. These two questions were assessed in an experiment in which one-half of the participants typed in their thoughts (verbal protocols) to two paintings and two fables prior to providing their ratings of enjoyment, interest, and understanding. The other half supplied the ratings without verbalizing their thoughts. The third research question was whether producing verbal protocols would affect their ratings. Due to the somewhat inexpressible nature of aesthetic experiences, it was predicted that providing verbal protocols would interrupt the process in which aesthetic responses are formed. Initial analyses of the data indicate that providing verbal protocols lowered ratings of self-understanding to artworks but not to fables. We are currently analyzing the protocols to address the first two research questions.

137 Guadalupe Barragan, Rigoberto Bermudez

*Political preferences as indicators of attitudes toward disability disclosure and LGB disclosure in the workplace.*

**Author(s):** Guadalupe Barragan, Rigoberto Bermudez, Robert Keating, Alecia Santuzzi  
**Department:** Psychology  
**Faculty Mentor(s):** Alecia Santuzzi  
**Session Time:** 9:00am - 10:15am

This study will examine the relationship between individuals’ political preferences and their attitudes toward the appropriateness of disability disclosure and lesbian, gay, or bisexual identity disclosure in the workplace. Recent research has emphasized the importance of disclosure in the workplace for people with disabilities (PWD) and lesbian, gay, and bisexual (LGB) individuals due to the important personal outcomes and work-related outcomes of disclosure. The anticipated reactions of coworkers is an important antecedent of disclosure. However, given the current sociopolitical climate, PWD and LGB individuals may be reluctant to disclose at work depending on their perceptions of their coworkers’ political preferences. An online survey was administered to 205 MTurk workers. We will examine the effect of participants’ political preferences at three levels (ideology, party affiliation, and voting preference) and their attitudes toward the appropriateness of disability disclosure and LGB disclosure. This study will extend research on stigma disclosure at work to include individuals’ political preferences as an antecedent of disclosure attitudes. Results may inform understanding of the role of that political preferences play in the anticipated reactions of disclosure confidants.
138 Nicole Covello, Anneliese Pipitone, Ted Agbemaple, Bianca Barajas  
*The Influence of Parent Gender in the Relationship between Parental Depressive Symptoms, Co-Parenting Quality, and Child Depressive Symptom*  

Author(s): Nicole Covello, Anneliese Pipitone, Ted Agbemaple, Bianca Barajas  
Department: Psychology  
Faculty Mentor(s): Laura Pittman  
Session Time: 10:15am - 11:30am  

Children of depressed parents satisfy criteria for depression more frequently than nondepressed parents (Billings & Moos, 1983; Downey & Coyne, 1990). Although there is an abundance of research that focuses on the relationship between parental depressive symptoms and child outcomes, the field lacks research on how co-parenting quality (i.e., conflict, triangulation) mediates this relationship. Further, there is a lack of literature indicating how parental gender may impact this relation. Therefore, this study aims to analyze the association between parental depressive symptoms, co-parenting quality, child depressive symptoms, and the influence of parental gender. The sample consisted of 213 parents (50% female; 68% Caucasian) who completed an online questionnaire through Amazon Mechanical Turk about themselves, their families, and their eldest child (60% male). To participate in the study, the child needed to be entering the sixth grade at the time of data collection and the parent had to report living with their partner for two years or more (81% currently married to their co-parent; 16% currently living with their co-parent). Parents completed the following measures: Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995); Margolin’s (2000) Coparenting Questionnaire, and Cianchetti and colleague’s (2013) Child and Adolescent Behavior Inventory (CABI). Analyses will include descriptive statistics, correlational analyses, and mediation analyses using PROCESS macro in SPSS (Hayes, 2013).

139 Angelina McNeela, Christopher Haworth  
*To Go or To NOGO-A: Effectiveness of Immunotherapy in Post-Stroke Cognition*  

Author(s): Angelina McNeela, Philip Blankenship, Ashley Blackwell, Tia Donaldson, Shi-Yen Tsai, GL Kartje, Doug Wallace  
Department: Psychology  
Faculty Mentor(s): Doug Wallace  
Session Time: 11:30am - 12:45pm  

Approximately 795,000 people experience a stroke each year, with survivors exhibiting persistent impairments in cognitive function including a compromised ability to process visuospatial information, known as spatial neglect. Current treatment approaches have failed to improve these deficits; however, anti-NOGO-A immunotherapy has shown promise to reduce spatial neglect in a rodent model of stroke. Spatial working memory depends on optimal allocation of cognitive resources (i.e. directed attention); therefore, a rodent model of stroke would be expected to disrupt performance on the matching-to-place version (MTP) of the Morris Water Task. The current study examines the effectiveness of 11C7 in an aim to improve performance disruptions in the MTP task associated with a rodent model of stroke. Data collection and analysis is currently ongoing; however, the results may provide further support for the use of immunotherapy as an effective treatment for stroke-related cognitive impairments and may translate to treating stroke impairments in human patients.

140 Sujai Jimenez, Margaret Miller  
*Rape Myth and Risk Recognition*  

Author(s): Sujai Jimenez, Margaret Miller, Jennifer Milliken  
Department: Psychology  
Faculty Mentor(s): Michelle Lilly  
Session Time: 12:45pm - 2:00pm  

Approximately 18%–19% of women have experienced an attempted or completed rape in their lifetime (Breiding et al., 2014; Kilpatrick, Resnick, Ruggiero, Conoscenti, & McCauley, 2007), and approximately 5% of college women have experienced an attempted or completed rape within a given year (Fisher, Cullen, & Turner, 2000; Kilpatrick et al., 2007). Being able to recognize factors that place women at higher risk for sexual assault may be useful in reducing the prevalence of sexual assault. Rape myth acceptance (RMA) refers to the endorsement of false beliefs about rape, rape victims, and rape perpetrators (Burt, 1980; Burt & Albin, 1981). The present study examines the role of rape myth acceptance on women’s ability to detect risk for sexual assault. The sample was comprised of 74 undergraduate women
at Northern Illinois University. Linear regression was used to identify a model that explained 4.7% of the variance in risk recognition ($R^2 = 0.047, F(1, 74) = 3.53, p = 0.064$). Women's acceptance of rape myths ($r = -2.2, t = -1.88, p = 0.064$) appears to have a negative relationship with risk recognition in this sample. Although the model did not meet significance at the $p = 0.05$ level, the model was trending toward significance, and represents an area that should be further studied.

141 Edwin Li  
Systematic Inquiry of Abstract Concepts

Author(s): Edwin Li, Jane Neal  
Department: Psychology  
Faculty Mentor(s): Katja Wiemer  
Session Time: 11:30am - 12:45pm

Studying the semantic features of concrete concepts (e.g. dog- has four legs) has a long history in cognitive psychology, and offers important insight into categorization and semantic memory for such concepts (McRae et al., 2005). However, the nature of abstract concepts, or those “not purely physical or spatially constrained”, like idea, is not well understood (Barsalou & Wiemer-Hastings, 2005) because their features are much less straightforward to discern and describe. The goal of this study is to systematically investigate abstract concepts, which has been not been done before and build off of a coding system proposed by Wu and Barsalou (2009). The study consisted of 500 common abstract nouns, and participants (N = 50) were given 25 concepts. Participants were asked to list characteristics that are important for understanding the concept. The responses were recorded and were placed in “clusters” which means that the features were related to one another. This was done using two different coding schemes, 1) clusters coding looking at related features that do not stand alone. 2) using an adaptation coding system drawn from Wu and Barsalou (2009) including related situation properties (time, location) introspective qualities (evaluations), and ontological classifications. We can draw clusters of features that will lead to the findings of situational schemas for different types of abstract concepts. Thus far we have found distinct patterns (feature schemas) are present in concepts. Next we will determine if the size and number of the clusters are related to the semantic characteristics (e.g. perceived abstractness) of concepts.

142 Karina Alcantara  
An Examination of Discrimination, Fear of Deportation, and Help-Seeking Behavior in Relation to Psychological and Somatic Outcomes Among Latino College Students

Author(s): Karina Alcantara, Cara Allen  
Department: Psychology  
Faculty Mentor(s): Nina Mounts  
Session Time: 9:00am - 10:15am

The purpose of this research is to investigate discrimination, fear of deportation, help-seeking, anxiety, depression, and somatic symptoms among Latino/a college students. The research questions are: 1) Are there sex differences in reports of discrimination, fear of deportation, help-seeking, anxiety, depression, and somatic symptoms? 2) Are there legal status differences in any of the study variables? 3a) Is there a relationship between discrimination and anxiety, somatic symptoms, and depression? 3b) Are the relationships moderated by help-seeking? 4a) Is there a relationship between fear of deportation and anxiety, somatic symptoms, and depression? 4b) Is the relation moderated by help-seeking? Participants include 45 Latino/a (51.1% female) college students (15.6% Freshman, 24.4% Sophomore, 31.1% Junior, 28.8% Senior) who attend Latino/a student group meetings on campus. The age range of the participants is 18 – 24 years (mean: 21.1 years). The data for this study was collected using self-report questionnaires. T-tests and regression analyses will be conducted using SPSS.

143 Rigoberto Bermudez, Guadalupe Barragan  
Inclusion as a predictor of disability and LGB disclosure at work: The mediating role of organizational support and diversity climate.

Author(s): Rigoberto Bermudez, Guadalupe Barragan, Robert Keating, Alecia Santuzzi  
Department: Psychology  
Faculty Mentor(s): Alecia Santuzzi  
Session Time: 11:30am - 12:45pm

This study will examine the role of inclusion in the decision to disclose a concealable stigmatized identity in the workplace and whether perceptions of support and perceptions of diversity climate mediate this relationship.
Individuals with concealable stigmatized identities are faced with weighing the costs and benefits of both revealing and concealing their identity. This cost-benefit analysis can be a psychologically burdensome experience, and important personal outcomes (e.g., authenticity) and work-related outcomes (e.g., accommodations) may be forgone regardless of the decision. Research suggests that inclusive work environments may be one way to reduce this burden by providing individuals with a sense of belonging and a sense of authenticity. We propose that such inclusive conditions will foster supportive and diversity affirming environments that will communicate to individuals they are in a safe environment for disclosure. An online survey was administered to 205 MTurk workers. We will test whether participants’ perceptions of inclusion predict disclosure of a disability (invisible physical, psychological, and cognitive) and non-heterosexual identity. We will further examine whether perceived organizational support and diversity climate perceptions statistically mediate this relationship. This study will extend current research on disclosure and organizational inclusion climate to include a theoretically grounded conceptualization of inclusion. Results will add to understanding of the conditions that promote disclosure in the workplace.

144  **Giselle Sanroman**  
*Influence of Juvenile Methylphenidate on Motivational Behavior*

**Author(s):** Giselle Sanroman, Zoe Bond, Sadie McWaters, Eden Anderson, Leslie Matuszewich  
**Department:** Psychology  
**Faculty Mentor(s):** Leslie Matuszewich  
**Session Time:** 12:45pm - 2:00pm

Methylphenidate (MPH), Ritalin, is a central nervous system stimulant that is commonly prescribed to children with Attention-Deficit Hyperactivity Disorder (National Institute on Drug Abuse, 2014). MPH has been shown to influence motivation in the short-term in adults (Rubia et al., 2009), but whether MPH treatment during development has long-lasting effects into adulthood has yet to be determined. Motivation can be influenced by individual differences in behavior. In rodents, individuals differences associated with motivation have been categorized by their interactions in an operant box with either levers as sign trackers or with the sugar pellet dispenser as goal trackers. Sign trackers attribute greater incentive salience towards a conditioned stimulus (Yager & Robinson, 2013). MPH is known to enhance the salience of stimuli and impact motivation in mental processes in humans (Volkow et al., 2004). Based on these findings, we hypothesized that rats treated with MPH will have a larger proportion of sign trackers than goal trackers. For the current study, rats were treated with 2.0 mg/kg MPH or vehicle provided on a cookie from postnatal day 20-34, the “juvenile period” of rat development (Sengupta, 2013). In adulthood, the rats were assessed for their behavior in an operant box through calculating a score based on the probability of pressing levers versus the probability of waiting by the food dispenser. The implications of this study will contribute to our understanding of MPH’s ability to alter reward processing regions and its effect on incentive salience towards a conditioned stimulus (Rubia et al., 2009).

145  **Angela Lake, Natalie Gonzalez**  
*The relationships between family relationships, peer and sibling relationships, and adolescent substance use.*

**Author(s):** Angela Lake, Matthias Miller, Natalie Gonzalez, Meg Huntoon  
**Department:** Psychology  
**Faculty Mentor(s):** Amanda Durik  
**Session Time:** 10:15am - 11:30am

In this study, we explore the relationships between parent-child relationships, peer and sibling relationship quality, and adolescent substance use. Our project draws from past work showing that the quality of family relationships predicts substance abuse in children (Gattamorata, Varela, McCabe, Mena, & Santisteban, 2017; Hodge, Salas-Wright, & Vaughn, 2017; Kim, Ali, and Kim, 2016; Pizarro, Bustamante, & Surkan, 2017). We are examining a more nuanced version of this relationship. If low quality family relationships actually contribute to increased substance abuse, then we might expect that the presence of a high quality relationship with a peer or sibling might attenuate the effect. We used data from the Health Behavior in School-aged Children (2009) assessment administered in several countries. We predict that individuals who perceive their parent(s) as difficult to talk to will show increased alcohol, cigarette, and marijuana use. We also expect to find that this relationship will be weakened when they receive high-quality social support from a peer or sibling. Results and implications will be discussed.
146  Bethany Beggs  
*Bullying Participant Role Behaviors and Social and Emotional Outcomes*  
  
Author(s): Bethany Beggs  
Department: Psychology  
Faculty Mentor(s): Michelle Demaray  
Session Time: 11:30am - 12:45pm  

The current study was designed to investigate bullying participant roles and their associated social and emotional outcomes. Bullying is an important and prevalent problem in schools today, with participation in bullying indicating negative outcomes later in life. Data was collected from 303 students attending a middle school in the rural Midwestern United States. Participants were asked for demographic information and were given two measures: the Bullying Participant Behaviors Questionnaire (BPBQ) and the Strengths and Difficulties Questionnaire (SDQ). The bullying role behaviors from the BPBQ were used as independent variables: bully, victim, assistant, defender, and outsider. Four subscales of the SDQ were used as dependent variables: emotional problems, conduct problems, peer relationship problems, and prosocial behavior and gender was included as a moderator. A series of regressions were run to explore unique associations among bully role behaviors and social emotional outcomes for boys and girls. All of the regressions were significant with bully roles demonstrated differential associations with social emotional outcomes. Results and implications will be presented.

147  Joanna Baumeister  
**Pulling their Weight: Immediate Effects of Anti-NOGO-A Immunotherapy on Motoric Functions after Stroke**  
  
Author(s): Joanna Baumeister, Ashley Blackwell, Philip Blankenship, Tia Donaldson, Shih-Yen Tsai, Gwendolyn Kartje, Douglas Wallace  
Department: Psychology  
Faculty Mentor(s): Douglas Wallace  
Session Time: 9:00am - 10:15am  

Stroke affects 795,000 Americans annually and is a major cause of long term disability often leaving patients with various impairments in upper and lower limb function. Current treatment of stroke typically involves rehabilitative strategies (such as physical therapy) that produce limited success or rarely generalize across cases. Rodent models have been a crucial tool in elucidating the mechanisms mediating recovery of function following stroke. Recently, research has shifted the focus of treatment to Anti-NOGO-A immunotherapy, which has been demonstrated to increase neuroplasticity and may help treat the motor deficits associated with stroke (Tsai et al., 2011). String pulling is a spontaneously occurring, highly organized behavior that can be used to evaluate movement organization associated with bimanual coordination. This novel behavior is an advantageous technique compared to traditional assessment due to less stressful nature and minimal training required. Immediately after receiving the Anti-NOGO-A immunotherapy, the animals were assessed for gross (i.e., failure to make a contact with a string) and fine (i.e., range of motion) motor control. Although data analysis is still ongoing, the results from the current study may provide foundation for development of future treatments.

148  Juan Cibrian, Matthias Miller  
**Does Perceived Gap Size Increase Curiosity? A Study of Free Choice**  
  
Author(s): Juan Cibrian, Matthias Miller, Sarah Coley, Amanda Durik  
Department: Psychology  
Faculty Mentor(s): Amanda Durik  
Session Time: 10:15am - 11:30am  

Curiosity refers to the desire for knowledge, and is theorized to emerge when people perceive a small gap between what they know and what they want to know (Loewenstein, 1994). The current research aims to test ways to present scientific information that might inspire curiosity to learn about a scientific process. In a prior experiment by this lab, the impact of perceived knowledge gap sizes upon curiosity did not emerge (Lake, Nagel, Williams, Coley, & Durik, 2016). The most important item for measuring curiosity in the study was the behavioral choice that participants made regarding whether they wanted to view the information that would fill the knowledge gap. The ordering of the procedure may have obscured the effect of condition due to participants not being assured compensation for participation until after they had answered the question. The current experiment is similar to the prior experiment, with one methodological change. As in the previous experiment, participants will partake in the study online and receive
information about the process by which bees make honey. The perceived size of the knowledge gap will be manipulated. However, in contrast to the prior study, participants in this study will be notified that they have completed their obligation for being paid prior to making the choice about whether they want to view the information that fills the gap. It is hypothesized that participants in the small gap condition will choose to view the information more than those in the large gap condition.

149  Kelsey Jennings

“How do I get home?” Evaluating home base establishment in animals with Usher syndrome and the effectiveness of antisense oligonucleotide therapy

Author(s): Kelsey Jennings, Tia Donaldson, Frederic Depreux, Michelle Hastings, Douglas Wallace
Department: Psychology
Faculty Mentor(s): Douglas Wallace
Session Time: 9:00am - 10:15am

Usher syndrome is a genetic disorder that affects hearing, vision, and vestibular function. Usher syndrome prevents synthesis of harmonin, a protein necessary for proper function of these sensory systems. Disruptions in vestibular function has been shown to impair self-movement cue processing and has been shown to reduce home base stability. The current study evaluates the effectiveness of an antisense oligonucleotide (ASO) therapy as a way to restore synthesis of harmonin and restore home base stability in a mouse model of Usher syndrome. Heterozygous (control) and homozygous (mut) mice received an ASO or control treatment at postnatal day 5 and organization of exploratory behavior was assessed 2 months later. An exploratory session involved placing mice on the center of a circular table for 50 minutes. Exploratory sessions were conducted under dark and light conditions. Circular statistics were used to calculate stop concentration across five 5-minute samples under each condition. Analysis of home base stability is currently ongoing. The results of the current study will provide further insight to the effectiveness of ASO therapy to rescue vestibular function in a rodent model of Usher syndrome and influence spatial orientation.

150  Mark Banovetz, Teri Faulkner

Reaching for Recovery: The Effects of Delayed Anti-Nogo-A Immunotherapy on Fine Motor Control After Middle Cerebral Artery Occlusion.

Author(s): Mark Banovetz, Ashley Blackwell, Phil Blankenship, Tia Donaldson
Department: Psychology
Faculty Mentor(s): Doug Wallace
Session Time: 11:30am - 12:45pm

Stroke is one of the leading causes of disability in the United States, often resulting in disruption in fine motor control. These disruptions make even simple, yet essential, tasks of daily living nearly impossible in many cases. The lack of effective treatments has prompted the development of rodent models of strokes to evaluate novel therapeutic interventions. In this experiment, a rodent model of stroke (middle cerebral artery occlusion, MCAO) was used to evaluate delayed administration of Anti-Nogo-A antibody immunotherapy (11C7) on bimanual coordination during a string-pulling task. Rats received 4 trials per week for 6 weeks; topographic and kinematic organization of fine motor control was then analyzed via movement tracking software. Data collection is currently ongoing. This experiment will establish the effects of MCAO on fine motor control and potentially demonstrate the effectiveness of delayed post-stroke therapeutic approaches.

151  Shannon L. Gallagher

To skim or not to skim?

Author(s): Shannon L. Gallagher, Kathryn E. Rupp, M. Anne Britt
Department: Psychology
Faculty Mentor(s): M. Anne Britt
Session Time: 12:45pm - 2:00pm

When your instructor sends you an article to read, you may think it is important to read closely for discussion the next day. Conversely, when your friend sends you an article asking you to read it for discussion, it is likely you are not going to put much effort into it. This study examines whether task instructions affects your memory for arguments and whether this is due to your representation of the context (context model) or goals/actions for reading (task model). We used a 2 requesters (authority/peer) by 2 task instructions (interest/prepare to discuss) within-subjects design.
Participants viewed pictures of a situation to imagine the context. They then read arguments on four controversial topics to either “read for personal interest” or “read to discuss” instructions. Each argument had 12 supporting and 12 opposing statements to the main claim. After reading, they completed a recognition tasks to measure their memory for the arguments. They were also asked for the actions used to meet their goal (task model) and what items they recall from the contexts (context model). We expect that participants asked by a high authority requester to read to discuss the topic will have a much more balanced perspective, as shown by higher recall for other-side information, than the other three conditions. Furthermore we expect that the goals and participants’ memory for the situation they were placed in will affect the extent to which they demonstrate a Myside Bias.

152  **Aaron Sweetwood**  
*Why People Believe*

**Author(s):** Aaron Sweetwood, Dylan T. Blaum, M. Anne Britt  
**Department:** Psychology  
**Faculty Mentor(s):** M. Anne Britt  
**Session Time:** 10:15am - 11:30am

Oftentimes people will use support their arguments using false or unsupported statements from online sources, such as social media, without knowing whether or not the statement is true. The purpose of this study is to determine where people get their information and if they used false or unsupported statements in arguments. Additionally, we are looking at the believable of the statements to assess whether personal belief is a factor in the decision to use the false information in arguments. After running a pilot of seventeen statements, we narrowed down our statement list to ten conserves study time. The pilot was to be rated based on truth by numbering each statement from 1-17 with each number being used only once. There were 17 participants in the pilot one of which the data was usable. The spread of the political views included: 7 democratic, 4 republican, and 5 others (libertarians). We chose the top four rated answers among each of the political affiliations we questioned, and three additional statements from the bottom third that will be used in the survey. In the survey, participants will rate the chosen statements on a scale from 1-10 based on truth. The next section focuses on their input of why they believe or not believe the statement to be true. The following section assesses where they have heard this information, and the last portion of the survey is to determine if they have actually used the unsupported statements as the basis of their arguments.

153  **Kiana Martin, Michael Nazario, Kathryn Klement**  
*Her Eyes Said Yes: Sexual Entitlement Predicts Dating Beliefs and Pick Up Techniques*

**Author(s):** Kiana Martin, Michael Nazario, Megan Pietrick, Teal Hemmerling, Phoebe Xoxakos, Shawn Salley,  
**Jamison De La Fuenta, Kathryn Klement**  
**Department:** Psychology  
**Faculty Mentor(s):** Brad Sagarin  
**Session Time:** 9:00am - 10:15am

Sexual entitlement is a belief that one has a right to sex and has a right to demand it (McNulty & Widman, 2014). Sexual entitlement is related to many negative outcomes such as sexual aggression, infidelity, sexual exploitation, and sexism. Previous research has indicated a relationship between sexual entitlement and adversarial sexual beliefs (the belief that men and women compete on different teams for sex and dating). In our study, we examined whether we could replicate this effect and also extended it to investigate whether people who were higher in sexual entitlement would also report the use of pick-up artist techniques. As part of a larger study, 78 students completed measures of sexual entitlement, adversarial sexual beliefs and use of pick-up artist techniques. We found support for both hypotheses: greater sexual entitlement predicted adversarial sexual beliefs and the use of pick-up artist techniques. We suggest that people who believe that they deserve sex also believe that sex is a competition between men and women and are more likely to use manipulative dating techniques to win.
**154 Bianca Gomez**  
*Co-parenting as a Mediator for Marital Satisfaction and Child Anxiety Symptoms.*

Author(s): Bianca Gomez  
Department: Psychology  
Faculty Mentor(s): Laura Pittman  
Session Time: 11:30am - 12:45pm

A great deal of research has focused on marital satisfaction and parenting practices. One such study has found that toddlers become more aware of the parenting patterns their parents use such as cooperative (parents presenting a united front) or competitive parenting (giving the child conflicting messages; Christopher et al., 2015). Other research has found that competitive co-parenting is associated with higher levels of anxiety and aggression in toddlers (McHale & Rasmussen 1998). However, there is a lack of research focused on children’s anxiety symptoms as a result of marital satisfaction and co-parenting quality (i.e., conflict, triangulation, cooperation). On that account, this study intends to analyze the relationship between parental marital satisfaction and child anxiety symptoms with co-parenting as the mediator. The sample consisted of 213 parents (50% female; 68% Caucasian) who completed an online questionnaire through Amazon Mechanical Turk about themselves, their families, and their eldest child (60% male). To participate in the study, the child needed to be entering the sixth grade at the time of data collection and the parent had to report living with their partner for two years or more (81% currently married to their co-parent; 16% currently living with their co-parent). Parents completed the following measures: Revised Dyadic Adjustment Scale (Busby et al., 1995); Margolin’s (2000) Coparenting Questionnaire, and Cianchetti and colleague’s (2013) Child and Adolescent Behavior Inventory (CABI). Analyses will include descriptive statistics, correlational analyses, and mediation analyses using PROCESS macro in SPSS (Hayes, 2013).

**155 Sam Ehret**  
*Religious and Collegiate Social Bonds: Applying Durkheim’s Theories to Rates of Anxiety in College Students*

Author(s): Sam Ehret  
Department: Sociology  
Faculty Mentor(s): Diane Rodgers  
Session Time: 9:00am - 10:15am

Although anxiety disorders are among the most common mental illness in the United States, little research has examined institutional influences on rates of anxiety. Using Durkheim’s theory of solidarity, I examine the connections between religious involvement, collegiate involvement, and rates of anxiety in college students in the Midwest. With a survey sample of 62 respondents, I found evidence that both religious and collegiate involvement are negatively associated with rates of anxiety, with religion being more protective. I also found evidence that rates of anxiety vary between denominations, though differently than Durkheim’s findings due to changes in social bonds and religion. Solidarity decreases youth anxiety rates with religious involvement being more protective than collegiate involvement against the negative effects of anxiety.

**156 Michael Bonilla-Wier**  
*Assessing the reading habits of students*

Author(s): Michael Bonilla-Wier, Anne Britt, Amanda Durik, Kathryn Rupp, Dylan Blaum  
Department: Psychology  
Faculty Mentor(s): Kathryn Rupp, Anne Britt  
Session Time: 12:45pm - 2:00pm

This study involves the cognitive learning processes many students use for studying purposes. This is an important topic as it looks into specific techniques students use to gather information from a source of data. With this research we can have a more accurate understanding involving students learning habits. To do this we will make a survey students will answer that pertains to learning and their mental abilities with regards to gathering relevant information from a text. The first part of the survey asks of the students to answer general questions about their interest in psychology and related materials. After this the students will be asked to recite what they believe is pertinent to forming a good argument and a good explanation. Students are required to answer what goals and actions they may use while reading to construct a good argument or explanation of what they have read. Once this is done, students will read three different texts, all pertaining to psychology, and then write down what they believe to be important information that was present in these texts. After this, the students will answer questions regarding their interest in the topics they just
read and if they are interested in learning more about the topics. This is a descriptive study that aims to discover what role task goals play in the comprehension of arguments and explanations.

157  Adonis Totten  
Reshaping Father's Day: A Qualitative Study of the African American Fathers

Author(s): Adonis Totten  
Department: Sociology  
Faculty Mentor(s): Jan Reynolds  
Session Time: 9:00am - 10:15am

The nuclear family structure has diminished over the past several decades, which has drastically affected marriage rates. With the decline in marriage, subsequently there has also been an increase of children born out of wedlock. Amongst African American/Blacks, research suggests that “70% of black children are born to unmarried mothers, and at least 80% of black children can expect to spend a significant part of their childhood years living apart from their father” (Hamer, 2001). With the maternal parent leading the household, black fathers in American have been portrayed negatively when it relates to childrearing. They are viewed as irresponsible, and culpable for the dilapidated black community; due to their absenteeism in their children lives. The media and literature tends to use a narrative that stereotype African American fathers as absent and unsupportive parents, which implies that African Americans father’s childrearing may solely be defined on the physical presence in the home. The presence of the American African father is what is salient to the general public, which would incontrovertibly reverse the rife poverty rate and the matriarch household structure of the African American family. Many of these thoughts and stereotypes of African American fathers may not accurately reflect the reality of their parenting. The current study uses a qualitative approach to investigate the involvement and parent style of African American fathers, as well as other contributing factors that may directly affect their involvement.

158  Daria Porter  
Adolescent Attitudes Towards Police

Author(s): Daria Porter  
Department: Sociology  
Faculty Mentor(s): Kirk Miller  
Session Time: 12:45pm - 2:00pm

The purpose of the study is to collect data and information about adolescents’ views of the police. There is limited research on the topic, and in the time of social reform and social injustice little focus is on adolescents. Our research question is objective - what are adolescents’ views of the police? Through a literature review, we have found indicators that adolescents’ views on the police rely heavily on race/ethnicity, socioeconomic status, neighborhood safety/crime rate in the area, involvement in institutions (athletics, religious activities, etc.), and views of other authority figures (parents, teachers, etc.). With our research, we hope to inform the public on the views of adolescents as well as inform law enforcement; to further help community relationships between law enforcement and the community.

159  Keyana Payne  
Color-Blind Story Lines

Author(s): Keyana Payne  
Department: Sociology  
Faculty Mentor(s): Carol Walther  
Session Time: 9:00am - 10:15am

Chapter 5 of Bonilla-Silva’s book (2014) Racism Without Racist explores the major story lines that whites use to either remove themselves from blame of racism or deny altogether that it is still a very real and prevalent issue. I interviewed three students to find out whether the questions I asked about race would produce the same or similar story lines. I thought students would be more progressive than the students interviewed in Bonilla-Silva’s book, but I found support for Color-Blind racism in some of their answers, even though they did not specifically say the phrases Bonilla-Silva highlights as key phrases to classify storylines. I use the theory of Color-Blind racism, Bonilla-Silva’s theory of “story lines”, and Bonilla-Silva’s theory of “the style of Color-Blind racism” to analyze the students answers to questions related to race, ethnicity, and racism. My findings were only based off of three students so better research is needed to support my conclusion.
160  Rachel Beehler  
*Inequality in the Criminal Justice System*  

Author(s): Rachel Beehler  
Department: Sociology  
Faculty Mentor(s): Carol Walther  
Session Time: 12:45pm - 2:00pm  

This study analyzed inequality within the criminal justice system, specifically in regards to economic class. The researcher hypothesizes that those of low economic standing will have higher rates of charging and conviction, and lower rates of having a criminal charge dropped compared to those of middle and upper economic standing. By performing qualitative interviews with those involved in the criminal justice system, the research believes associations between economic standing and involvement within the criminal justice system may be made.

161  Flavio Leanos-Macias  
*Improving Support Programs for First Generation College Students.*  

Author(s): Flavio Leanos-Macias  
Department: Sociology  
Faculty Mentor(s): Diane Rodgers  
Session Time: 9:00am - 10:15am  

First generation college students are at greater risk of leaving their education at an earlier time and not completing their college education as opposed to their peers. This is a problem due to the high number of first generation college students who never complete their education and thus affects their life chances. There are many adversities that this population of college student face. They usually come from a working class background that hinders their ability to fully submerge themselves in their studies or support programs because often they need to work. An initial review of programs that help first generation college students appears that they do not take limits on time into serious consideration. Through feedback gained from surveys and interviews with administrators and first generation students at several Midwestern community colleges and four year universities, I plan on proposing improvements to first generation programs that are better tailored to meet their unique needs. These results will be shared with the participating colleges and Universities.

162  May-Myo Khine  
*Contemporary Female Burmese Performance Artists*  

Author(s): May-Myo Khine  
Department: School of Art and Design  
Faculty Mentor(s): Catherine Raymond  
Session Time: 9:00am - 10:15am  

My research is focused on contemporary female Burmese artists, who see themselves as primarily performance artists: a contemporary art form, in which the artists use their body as the medium. Some such artists have created a style of performance reflecting the situations of Myanmar/Burma; which from 1962 to 2011, was ruled by a military regime enforcing near-total international isolation, and severely restricted freedom of expression and freedom of speech: an extremely challenging and personally risky time to create unconventional artwork in Myanmar. Nevertheless, thanks largely to pioneering experimental artists who flatly defied censorship, a performance art scene there has emerged straight in the face of a traditional conservative patriarchal society where females are generally undervalued. Thus, unsettling art created by uncontrolled female artists is an especially difficult sell. The proposed initiative highlights the roles of female performance artists working within the contemporary art scene there and their arguably positive contributions to larger Burmese society. Our new work would provide a glimpse, from an academic perspective, into a community heretofore barely documented. Northern Illinois University (NIU) Art History Prof. Catherine Raymond—knowledgeable across the wide range of Burmese art, and Director also of the Center for Burma Studies there— guided and assisted this inquiry.
200  Jessica Helwig  
*The Effects of Biochar on Bacterial Communities*

Author(s): Jessica Helwig  
School: Rock Valley Community College  
Faculty Mentor(s): Moria Nagy  
Session Time: 10:15am - 11:30am

The effects of biochar on bacterial communities found in agriculture and natural soil samples were investigated. Biochar is a torrefied or charred wood made through a process called pyrolysis. Pyrolysis is a process that chemically decomposes biomass, specifically by heating it at high temperatures in an oxygen deprived environment. Studies have shown that the addition of biochar to soil supports microbial communities (Budai, et al., 2016). After collecting soil samples from an agricultural field and a urban forest culturing of soil bacteria sample was performed. Cultures were incubated at room temperature and isolated on tryptic soy agar. Bacterial Isolates were Gram stained using aseptic technique. Using the gram stains bacterial isolates were characterized by collecting gram result, size, and morphology data. The structure of biochar and its physical interaction with bacteria was visualized and recorded by using oil immersion microscopy. Bacteria were found to be numerous in agricultural and urban forest soils. The relationship between biochar and the soil microbial communities is still under study.

201  Amanda Stasiewicz  
*Pre-trial Services*

Author(s): Amanda Stasiewicz  
School: NIU Fall 2017 Graduate  
Faculty Mentor(s): Carol Walther, Jack King  
Session Time: 9:00am - 10:15am

Overcrowding jails is a huge problem in America. Supervised Pre-trial Release aids as a possible solution to this problem by preparing defendants for bond call by interviewing he or she to assess their risk for recidivism, flight risk, and risk to their community. Data was collected from case files in a local county in order to evaluate the effectiveness of Pre-trial Services based on three hundred ninety-seven cases.

202  Hillary Smith  
*Exploring chemical cycling and metabolic strategies of microbial communities in Winogradsky columns*

Author(s): Hillary Smith  
School: Waubonsee Community College  
Faculty Mentor(s): Tracey Dosch, Justin Hoshaw  
Session Time: 10:15am - 11:30am

The Winogradsky column is an enrichment culture technique which encourages the development of an interacting multispecies system. It permits the cultivation of microbes that cannot grow under standard laboratory conditions. Soil and water samples from a local creek were treated with varied chemical enrichments and light levels. DNA from several positions on each column was isolated and amplified via polymerase chain reaction. Primers were selected to identify archaeal and bacterial 16S rRNA, eukaryotic 18S rRNA, dissimilatory bisulfite reductase genes and methyl coenzyme M reductase genes. Results were then visualized using gel electrophoresis. This offers insight into local microbial soil ecology.

203  Nicolas Barrios  
*Various antimicrobial agents compared for antimicrobial inhibition using several bacterial species*

Author(s): Nicolas Barrios  
School: Waubonsee Community College  
Faculty Mentor(s): Justin Hoshaw  
Session Time: 11:30am - 12:45pm

Many deadly, pathogenic bacteria are evolving to the point where last resort antibacterial drugs can no longer save the lives of infected individuals. As more bacteria have become resistant to drugs, this dilemma is now seen as a threat to human life on Earth. This experiment aimed to discover how effective various antimicrobial agents inhibit bacterial
growth when tested against a diverse sample of bacteria using the disk diffusion method. The disk diffusion method is a popular choice for testing the sensitivity of bacteria to various chemicals because of its efficiency, convenience, and cost. This method was used to test basil oil, cassia oil, clove oil, eucalyptus oil, oregano oil, wintergreen oil, honey, garlic, and copper for their antimicrobial effectiveness. The bacteria used for these tests were Bacillus subtilis, Escherichia coli, Staphylococcus aureus, and Pseudomonas aeruginosa. The disks measured 7 mm in diameter. They were soaked in the antimicrobial agents and the diameter of the zone of inhibition was measured. This measurement included the 7 mm diameter of the disk. Wintergreen oil was effective against all bacteria but minimally inhibited the growth of P. aeruginosa. All oils except wintergreen and cassia oil failed to inhibit the growth of P. aeruginosa. Basil oil very minimally inhibited the growth of E. coli and S. aureus. It did however, show more significant inhibition against B. subtilis. Oregano oil did not inhibit E. coli growth. While effectiveness of the agents on the bacteria varied, cassia oil exhibited the most inhibition.

204  Sonya Gupta, Nabeel Rasheed  
Neurobehavioral Biomarkers as A Potential Gateway for Offsetting Early Coronary Heart Disease Risk in Adolescents

Author(s): Sonya Gupta, Nabeel Rasheed  
School: Illinois Mathematics and Science Academy  
Faculty Mentor(s): Anna Varentsova, Lei Wang (Northwestern University)  
Session Time: 10:15am - 11:30am

Neurological research has yet to fully link socioeconomic status (SES) disparities to Coronary Heart Disease (CHD) risk. Numerous studies have related adult CHD risk with SES, but little is still known about adolescent CHD risk and its cerebral origins resulting from SES disparities. We collected structural magnetic resonance imaging (sMRI) data from 41 adolescents between the ages of 13 and 14. Using sMRI software tools on computerized brain models, we manually assessed 6,232 subcortical regions for 3.5+ million slices and associated their found cerebral cortical thickness (CTh) and gray matter volume (GMV) biomarker values with adolescents’ respective SES scores. We used these associations to predict CHD risk in adolescents. We found SES to be significantly positively correlated with cerebral CThs in the lingual gyrus, precentral gyrus, lateral orbitofrontal, postcentral gyrus, superior parietal lobule, precuneus, entorhinal cortex, and middle temporal gyrus. In addition, we found SES to be significantly positively correlated with cerebral GMV in the medial orbitofrontal, supramarginal gyrus, and temporal pole. These results indicate that adolescent SES is significantly positively correlated with several neurobehavioral biomarkers of CHD risk. These findings trace adolescent SES to CHD risk, thus introducing neurobehavioral biomarkers as a gateway into offsetting early CHD risk in adolescents.

205  Mounisha Kovour  
Longitudinal Imaging of the Thalamus in HIV Reactive and Non-Reactive Individuals in Two Time Points

Author(s): Mounisha Kovour  
School: Illinois Mathematics and Science Academy  
Faculty Mentor(s): Christine Paula Lewis-de los Angeles, Ann Ragin, Lei Wang (Northwestern University)  
Session Time: 10:15am - 11:30am

HIV is a prevalent disease that affects about 1.2 million people just in the United States and affects about 36.7 million people worldwide. It is a disease that transmits from person to person and can also infect through contamination of injection drugs or syringes. HIV is normally seen as a disease that can affect the immune system greatly but through current studies there has been many effects on the nervous system. In this study, we are putting a particular focus on the thalamus and the deformations that are present through the HIV infection. This study has two main groups of HIV Reactive and HIV Non-Reactive people. HIV Reactive individuals have been infected with HIV long enough to make antibodies while HIV Non-Reactive individuals have not created this antibody. The purpose of this study is to look at the thalamus of individuals in these groups and specifically investigate the sub-nuclei zones. For this study, MRI scans from the 56 HIV infected individuals along with 21 seronegative subjects were retrieved. These scans were put through multiple quality assurance checks along with the focus of the thalamus. A 3D model of the thalamus was created using IvyView. This model was used to look at the inward and outward deformations in the different regions. To further this research, we observed the MRI scans of the thalamus in two time points which were two years apart. Through this we were able to run comparisons between HIV Reactive & HIV Non-Reactive, HIV Reactive & Control and HIV Non-Reactive & Control. Through these comparisons HIV Reactive & Control along with HIV Non-Reactive & Control had a decrease in deformations in the medial and the pulvlar thalamus. The HIV Reactive & Non-Reactive group showed an increase in the deformations throughout the two-time points. These deformations through the comparison need to have more testing to fully solidify the results to be more accurate. This is because the there have not been many trials on these
comparisons. In this study, we were able to look at the first time point and observe that the thalamus overall had an overall outward deformation of 0.0000166667 from taking the mean of all the different regions. Through this study, a closer look was given into the deformations in the thalamus of HIV individuals. This study will hopefully be furthered to look at the effects of Antiretroviral therapy on HIV individuals to see if this drug can decrease the area of deformations to a further extent.

206  Claudia Zhu
Transcriptional Regulation of Brown Adipose Tissue Glucose Utilization

Author(s): Claudia Zhu
School: Illinois Mathematics and Science Academy
Faculty Mentor(s): Yuan Lu (Case Western Reserve University)
Session Time: 10:15am - 11:30am

Brown adipose tissue (BAT) evolved as a specialized thermogenic organ which plays a critical role in placental mammals' evolution. In modern days, BAT serves as a novel therapeutic target for metabolic diseases such as obesity and diabetes. During cold exposure, BAT utilizes glucose and fatty acids to maintain a constant body temperature (37°C) through non-shivering-thermogenesis (NST), which can serve as an efficient method to clear glucose and fatty acid in blood circulation. Krüppel Like Factor 15 (KLF15) is a transcription factor, which is expressed abundantly in adipose tissue, however its function in BAT is still unknown. In this study, we differentiated adipocyte progenitor cells from wild-type (WT) and KLF15-knock-out (KLF15-KO) mice into brown adipocytes and examined morphological, glucose metabolic signaling pathway (glucose transporter gene expression level), and mitochondrial glucose oxidative phosphorylation (OXPHOS) differences. While no morphological differences were found, glucose transporters 1 and 4 expression levels are significantly lower in KLF15-KO than in WT brown adipocytes. In addition, when stimulated with β-adrenergic receptor agonist CL-316243, KLF15-KO brown adipocyte glucose OXPHOS is significantly lower. These results indicate that KLF15 plays a critical role in brown adipocyte glucose metabolism.

207  Xinyu Guan, Nicholas Nusgart, George Jeno, Andriy Sheptunov
Decision-Making Swarms

Author(s): Xinyu Guan, Nicholas Nusgart, George Jeno, Andriy Sheptunov
School: Illinois Mathematics and Science Academy
Faculty Mentor(s): Sanza Kazadi (Illinois Mathematics and Science Academy)
Session Time: 10:15am - 11:30am

While swarms that execute decisions are well known in the swarm community, swarms that exhibit this capability a priori have never before been achieved. We demonstrate a methodology, based on the Hamiltonian method of swarm design, that enables the design and implementation of swarms that exhibit decision-making capability. We develop the theoretical structure of the method and apply it to the development of an ant algorithm and a swarm capable of deciding whether its density exceeds a specific predetermined value. The swarm designs are validated in simulation.

208  Elizabeth Heckmann, Hannah Ryu
Effects of Mycorrhizal fungi on Plant and Soil Communities.

Author(s): Elizabeth Heckmann, Hannah Ryu
School: Sycamore High School
Faculty Mentor(s): Jon Miller (NIU), Scott Horlock (Sycamore High School)
Session Time: 11:30am - 12:45pm

This study observed the influence of mycorrhizal fungi and its symbiotic relationships on plant and soil communities. Soil samples from local watersheds were collected and examined for the fungi, which were grown and used to inoculate 7 different native prairie plants. The growth rate of these plants and the final biomass from each site was measured and recorded. This data was then compared to a Qualitative Habitat Evaluation Index (QHEI) of the sites from which the fungi was originally collected. We predicted there would be a direct correlation between the abundance of mycorrhizal fungi in soil and the overall health of an ecosystem.
209  Nathan Flaherty, Grant Minnihan
The effect of riparian zones on water chemistry in the East Branch of the South Branch of the Kishwaukee River Sub-watershed

Author(s): Nathan Flaherty, Grant Minnihan
School: Sycamore High School
Faculty Mentor(s): Jon Miller (NIU); Scott Horlock (Sycamore High School)
Session Time: 10:15am - 11:30am

This study examines the effect riparian width has on the chemical stability of northern Illinois waterways. Previous studies examining the relationship between riparian width and chemical health have yielded results that show moderate to no correlation between the two, (Pruill et. al., 2000). Eight streams in the Dekalb County Watershed were tested for nitrite, nitrate, phosphate, and dissolved oxygen levels as well as pH. These results were then compared to the riparian width of the corresponding waterway to determine if a relationship between the two existed. We predicted that the wider the riparian width, the more stable chemical levels would be in the streams; indicating a more healthy water system. Our results, however, showed a far more moderate relationship between the Riparian Width and the chemical stability in the waterways, a conclusion that was similar to those in previous studies.

210  Julianne Morreale
Phosphorus Levels in the East Branch of the South Branch of the Kishwaukee River Watershed and their correlation with Riparian Buffer Characteristics

Author(s): Julianne Morreale
School: Sycamore High School
Faculty Mentor(s): Jon Miller (NIU), Scott Horlock (Sycamore High School)
Session Time: 11:30am - 12:45pm

The goal of this project is to determine the impact of shortened or removed riparian buffers on the phosphorus levels along with which type of riparian buffer is most efficient at reducing phosphorus levels in eight streams sites in the East Branch of the South Branch of the Kishwaukee River Watershed. These stream sites include Heron Creek at Motel Road, Union Ditch One, Two, and Three; Virgil Ditch One, Two, and Three; and the East Branch of the South Branch of the Kishwaukee River at Motel Road. Over the past four years Sycamore High School students have collected data from these eight different streams. Phosphorus was measured due to the dangers of increased phosphorus levels; which can lead to eutrophication, dense growth of plant life that can stop oxygen from reaching the stream’s wildlife (usda). In order to measure the phosphorus levels in these streams students have collected water samples and used the Exact Micro 7+ to measure the levels. This project compared the varying phosphorus levels from 2013, 2015, and 2016 to the presence and type of riparian zone buffers. Using these numbers, calculations were made to determine if these factors had any significant correlation to each other.

211  Stephen Brazier
Monitoring the presence of Corbicula sp. in the East Branch of the South Branch of the Kishwaukee River Sub-watershed

Author(s): Stephen Brazier
School: Sycamore High School
Faculty Mentor(s): Jon Miller (NIU), Scott Horlock (Sycamore High School)
Session Time: 10:15am - 11:30am

In this study, the effects of the invasive species Corbicula fluminea (Asian clam) were observed on native mussel populations. C. fluminea is a clam indigenous to Asia that has spread worldwide, causing major ecological impacts in aquatic ecosystems (Gomes et al. 2016). However, this species was first introduced into North America in 1924 and has spread throughout the continent since (Renard et al. 2010). A total of eight sites were surveyed in the East branch of the South Branch of the Kishwaukee sub-watershed in Illinois: East Branch of the South Branch of the Kishwaukee River, Union Ditch 1, 2, and 3, Virgil Ditch 1, 2, and 3, and Heron Creek. This was done in order to see if they contained mussels and if so, was C. fluminea present and causing a disturbance in the mussel population in comparison to other streams. It hypothesized that this invasive species decreased the mussel population. Due to a lack in data, it’s unclear as to whether or not this Asian clam affects the population of native mussels.
212  **Tim Lamoureux**  
*Monitoring the East Branch of the South Branch of the Kishwaukee River Sub-Watershed*

Author(s): Tim Lamoureux  
School: Sycamore High School  
Faculty Mentor(s): Jon Miller (NIU), Scott Horlock (Sycamore High School)  
Session Time: 11:30am - 12:45pm

During summers of 2014-16 eight different sites throughout the agricultural communities of Dekalb and Western Kane County, in the Kishwaukee River watershed have been closely monitored using qualitative habitat evaluation indexes, (QHEI’s). The goal of monitoring this sub-watershed is to set groundwork for future environmental sustainability projects. In the QHEI’s there are three types of measurements taken; physical measurements including stream width, depth, and levels of erosion, chemical measurements including nitrite levels, nitrate levels phosphate levels, dissolved oxygen levels, and pH, and biological measurements of plant diversity in the riparian buffers, and diversity in aquatic invertebrates. Tracking the watershed is a way to analyze the health of each site, and the overall health of the watershed. Monitoring the watershed will provides ways to view environmental patterns, and allows government agencies to make appropriate decisions concerning land management and water quality.

213  **Grace Gruner, Sophia McComb, Madeline McCormick**  
*Monitoring the presence of freshwater mussels in the East Branch of the South Branch of the Kishwaukee River Sub-watershed*

Author(s): Grace Gruner, Sophia McComb, Madeline McCormick  
School: Sycamore High School  
Faculty Mentor(s): Jon Miller (NIU), Scott Horlock (Sycamore High School)  
Session Time: 10:15am - 11:30am

This study of the freshwater mussel population was intended to identify the different species found in each sub-watershed of the Kishwaukee River Watershed. The purpose of this study is to determine the overall river quality and health with the use of mussel diversity and abundance. Throughout the summer of 2016, the group of sixteen students in the Watershed program at Sycamore High School visited nine sites within the sub-watershed known as the East branch of the South branch of the Kishwaukee River and performed mussel searches in a 200 foot breach of the water. This exploration of the river resulted in the discovery of the extent of mussel diversity in different branches. The correlation between habitat and mussel variation in relation to substrate is similarly discussed in the study, “Nonlethal assessment of freshwater mussel physiological response to changes in environmental factors” (Fritts, et al., 2015). Mussel surveys were conducted to determine the species present as well as the relative range of each species within the East branch of the South branch of the Kishwaukee River sub-watershed.

214  **Allison Vidades, Morgan Kozlowski, Abigail Swick**  
*Using aquatic invertebrates as an indicator of habitat quality in the East Branch of the South Branch of the Kishwaukee River Sub-watershed*

Author(s): Allison Vidades, Morgan Kozlowski, Abigail Swick  
School: Sycamore High School  
Faculty Mentor(s): Jon Miller (NIU), Scott Horlock (Sycamore High School)  
Session Time: 12:45pm - 2:00pm

Research conducted by the Sycamore High School Watershed class will be analyzed along with five other published articles to evaluate the health of several sites in the watershed of Dekalb County, Illinois. This information will be focused on the use of macro invertebrates as indicators of stream and watershed health, as well as solutions to restore and improve watershed health. It is generally agreed upon that many important watersheds contain unnatural and damaging chemicals, of which many are sourced from runoff of surrounding land (e.g. pesticides, fertilizers, exhaust from machinery and vehicles, etc.). It is also generally agreed that macro invertebrates, which are often quite particular about their ideal habitat conditions, are fairly sound indicators of pollutants in streams and watersheds. Analysis and comparison of information were drawn from different articles to reach the result that in order to maintain and improve watershed health, restrictions must be put into place pertaining to chemicals applied to any land.
215  Elliott Marsh
Seasonal changes in water chemistry in the East Branch of the South Branch of the Kishwaukee River Sub-watershed.

Author(s): Elliott Marsh  
School: Sycamore High School  
Faculty Mentor(s): Jon Miller (NIU), Scott Horlock (Sycamore High School)  
Session Time: 10:15am - 11:30am

Water samples were collected at 8 different sites in the East Branch of the South Branch of the Kishwaukee River watershed. The sites included 6 man-made agricultural ditches and 2 locations on the Kishwaukee River itself. The Kishwaukee River watershed is the main water system in DeKalb County. It also runs into Kane County. Samples were collected at three different times, July 2016, December 2016, and March 2017. Chemicals analyzed during this time included: nitrate, nitrite, phosphate, calcium hardness as well as PH. Differences and changes in the chemical levels were observed from the same chemical season to season. The purpose is to see if there is any variation due to agricultural runoff or for other reasons. Other scientists have found seasonal variations due to conditions such as point source pollution (Agbaire et al).
Abstracts

Exhibits

Please Note: All abstracts are printed as submitted by project participants, and are represented in the college of the student’s project.

\textsuperscript{\textregistered} denotes Research Rookies
\textsuperscript{SEF} denotes Student Engagement Fund (SEF)
\textsuperscript{SR} denotes Summer Research Opportunities Program (SRP)
\textsuperscript{U} denotes Undergraduate Special Opportunities in Artistry and Research (USOAR)
300 Matthew Woodall, Gunnar Baechler
*Mars Rover Rocker-Bogie Comparative Differential Study*

Author(s): Matthew Woodall, Gunnar Baechler  
Department: Mechanical Engineering  
Faculty mentor(s): Iman Salehinia  
Session Time: 10:15am – 11:30am

Extreme terrain traversal can be accomplished by a rover through the implementation of a Rocker-Bogie suspension mechanism. Rocker-Bogie mechanisms include independent pivoting linkages on either side of the rover connected through a differential system that keeps the chassis level. The purpose of this study is to perform a comparative analysis on the performance differences between two types of differential systems for a Rocker-Bogie suspension: a differential gearbox and a differential rod. The performance parameters used were the pitch angle, roll angle, and resulting angle range due to play in the pitch at increasing inclinations in comparison to the idealized values from theoretical calculations. Statistical hypothesis testing was applied to prove that there were statistically significant differences between the collected angle values of each system in order to distinguish performance from each differential system and the theoretical expectations. There was enough evidence to prove significant performance difference between the two systems in relation to resulting pitch angles and angle play, however there was not enough evidence to prove performance difference in the roll angle except at extreme inclination angles. With the proof of performance difference between the two systems, the differential rod’s performance values were then proven to be better than the differential gearbox’s values in relation to the expected theoretical values at 99 percent confidence. The proof of better performance of the differential rod led to further analysis and the implementation of the differential rod system on the NIU Mars Rover Team’s competition Mars rover.

301 Matthew Woodall, Dan Petschow, Tim Olson, Gunnar Baechler, Thomas Jareczek
*Picus Martius Mars Rover*

Author(s): Matthew Woodall, Dan Petschow, Tim Olson, Gunnar Baechler, Thomas Jareczek  
Department: Mechanical Engineering  
Faculty mentor(s): Iman Salehinia, Nicholas Pohlman  
Session Time: 9:00am - 10:15am

The Mars Society hosts an annual collegiate level robotics competition called the University Rover Challenge (URC) at the Mars Society Desert Research Station in Utah. The URC is a task oriented competition featuring challenges and obstacles replicating those expected during the colonization of Mars such as astronaut assistance, extreme terrain traversal, autonomous operation, and scientific experimentation. Picus Martius is NIU’s first submission into the URC and features a wide range of custom designed mechanical components. Implementing a concurrent engineering design process, each component was carefully selected based upon resulting design analysis, manufacturability, and economic feasibility. Picus Martius channels NASA’s Curiosity by employing a Rocker-Bogie suspension system with custom optimized wheels to achieve stable movement through rough terrain. The manipulation system includes five degrees of freedom to accomplish the dexterous tasks of the competition such as tool handling, refueling a tank, and operating valves. In addition, Picus Martius was created to lay the foundation for a new College of Engineering and Engineering Technology club called the NIU Mars Rover Team. The methodology of the design decisions and analysis has been thoroughly documented including tutorials to provide new team members with the ability to learn about proper organization and concurrent engineering.

302 Andrew Widmar
*NIU Robotics Microcontroller Learning and Development Kit*

Author(s): Andrew Widmar  
Department: Electrical Engineering  
Faculty mentor(s): Edward Miguel  
Session Time: 11:30am - 12:45pm

This project combines custom designed electronics boards and “off the shelf” electronic accessory devices into a kit designed to help facilitate electronics learning and project development. The kits are designed to provide equitable educational value at a fraction of the cost of other “starter” kits currently being sold. This is accomplished through a redesign and optimization of the market standard “Arduino” board and by selecting cost effective accessory devices to go into the kit. The market for the kits is students in the NIU College of Engineering and Engineering Technology who are interested in learning about electronics and need a place to start. The process of creating these kits uniquely
involves all aspects of an engineering project from start to finish. This includes: research, design, prototyping, manufacturing, parts procurement, assembly, functionality and quality testing, and documentation. The kit is being developed in collaboration with the NIU Robotics Club which is assisting with the assembly, testing, debugging, and ultimately, the selling and maintaining of the kits. In the future, the kits will serve as a fundraiser and learning project for the Robotics Club which will use tutorials built around the kits to help train new members.

**303 Abraham Baker**  
*Comparison of Healthy and Cancerous Pancreatic Tissue through Dissection and Imaging*

Author(s): Abraham Baker  
Department: Biological Sciences  
Faculty mentor(s): Daniel Olson  
Session Time: 12:45pm - 2:00pm

The pancreas is an organ responsible for producing hormones that regulate blood sugar levels as well as producing enzymes that assist in the digestive process. Despite these important roles in sustaining life, the pancreas is not covered in much detail in undergraduate-level gross anatomy courses. To develop a better understanding of the structure of the pancreas, two pancreata, one with pancreatic cancer and one without, were obtained through dissection of cadavers donated to the NIU Anatomy program. These pancreata were then serially sectioned by hand and scanned in a flatbed scanner to produce a series of images of their internal structures. Several open-source image visualization programs, including ImageJ and 3D Slicer, were used to produce 3D volume renderings of the pancreata. These renderings were then compared to those produced from CT scans of the pancreata taken prior to sectioning. While multi-detector CT scanning is by far superior to scanning sections by hand, it is an impractical approach to anatomical study at the undergraduate level. Flatbed scanning can produce sequential images and even 3D models of the interior structures of organs, helping to enhance anatomical education.

**304 Matthew Leon**  
*Contaminating the Linux Kernel: An overview of hijacking one of the most popular operating systems*

Author(s): Matthew Leon  
Department: Computer Science  
Faculty mentor(s):  
Session Time: 9:00am - 10:15am

This project explores the inner workings of the Linux Kernel’s memory structure and behavior. In this presentation, the audience will learn about the differences between user-space/kernel-space and how they work together, program execution, memory regions, protections and manipulation, and more broadly, how these antics may be used for evil purposes.

**305 Thomas Cowden, Colin Narug, Min Yi, Dahlin Waters**  
*Automated Foil Package Sealing Device Mechanical Design and Process Study in Collaboration with Daubert Chemical Company*

Author(s): Thomas Cowden  
Department: Mechanical Engineering  
Faculty mentor(s): Ji-Chul Ryu  
Session Time: 10:15am - 11:30am

Daubert Chemical Company is a global manufacturer and distributor of specialty adhesives, greases, and chemical solutions. Some of their production methods are still semi-automatic in nature, and a mechanical engineering design team was tasked with further automating one of their bag sealing processes. The previous method for sealing bags was characterized by use of a hand-held heat sealer and a foot pedal nitrogen purge nozzle. This method created inconsistent seals and non-uniform purging times, yielding shortcomings in guaranteed product quality. The project consisted of creating and controlling an automated heat sealer that was capable of producing uniform seals and a consistent nitrogen purge. The device was required to record data from each sealing cycle for upload to a centralized server to ensure the product quality of each shipment was acceptable to the buyer. To prevent fatigue and harm to the operators, a series of design considerations and sensors were applied to the device, and the system was created at an ergonomic height and position for ease of use during extended sessions. Sensors were implemented to prevent injury to the operators. Statistical quality control methods were utilized as an assessment of device functionality.
306  Eliya Baker
Dissection of Tissue and Drawing an Anatomical Atlas

Author(s): Eliya Baker
Department: Biological Sciences
Faculty mentor(s): Daniel Olson
Session Time: 12:45pm - 2:00pm

One of the more complex organs studied in undergraduate anatomy is the hand, which has many overlapping tendons and vessels that can be difficult to tell apart. The object of this research is to dissect a human hand and to draw diagrams of its parts in the style of traditional anatomical atlases. The distal forearm and the hand were removed from a cadaver in the Anderson Hall anatomy lab, and then dissected gradually from February to mid March. As each new layer of structures was exposed, a pencil sketch of the structures was drawn and labeled in the lab. Then the sketches were redrawn larger and colored with colored pencil to make the final versions of the diagrams. These diagrams are meant to be educational tools to help students more easily identify the parts of the hand.

307  Robert Kondratowicz
Open Source Drone Design for 3D Mapping Applications in Geographic Information Science

Author(s): Robert Kondratowicz
Department: Geography
Faculty mentor(s): Thomas Pingel
Session Time: 12:45pm - 2:00pm

Drone technology is a growing field that is becoming more accessible to new users. This has caught the attention of geographers looking for an efficient way to image and survey the land. The effective use of drones is currently limited by their expense and difficulty to repair. Howard with 3D printing becoming a widespread fabrication method, individuals are able to create complex and specialized parts by themselves at minimum cost. In this project we aim to use the fabrication potential of 3D printers to alleviate the issues of drone maintenance. The plan for the project is to develop an open source drone design that consist primarily of 3d printed and readily available materials to keep cost to a minimum. By having the ability to 3D print the majority of the parts the drone can be easily maintained and repaired, thereby reducing cost and increasing available operation time. This is important because field operation of drones for geographical purposes often is done in locations that have a high possibility of incurring damage to the drone. This project will make it easier for geographers to efficiently operate drones in these conditions.

308  Adam Zaucha, Fred Gilbert, Kyle Brown, Joshua Jufko, Mohammed Shamsi
Active Magnetic Levitation

Author(s): Adam Zaucha
Department: Mechanical Engineering
Faculty mentor(s): Sachit Butail
Session Time: 9:00am - 10:15am

Magnetic levitation has fascinated people for many years. Something that can “magically” float in midair gets people’s attention. The more amazing aspect is the physics behind what is actually happening. When magnetic forces in motion act upon nonferrous conductive substrate a magnetic field is produced from eddy currents projecting from the substrate. This magnetic field interacts with the magnetic field produced by rotating disks at a high rpm. This project will focus on the control and levitation of a craft utilizing magnetic levitation. Optimizing the distance between the device and substrate, the rotation of the motor, and the thickness of the substrate will give the best results and the greatest chance to achieve control of the device. This research could be utilized in industrial applications for movement of heavy objects.
309 Ryan Lewis
3D Visualization of Brain Tissue SEM Image Data

Author(s): Ryan Lewis
Department: Computer Science
Faculty mentor(s): Michael Papka
Session Time: 12:45pm - 2:00pm

This undergraduate research project focused on 3D reconstruction of brain tissue, based on images collected from Argonne National Laboratory’s Advanced Photon Source (APS) and Scanning Electron Microscope (SEM). 3D visualization techniques for the reconstructed image data were developed for printing with a 3D printer using Fused Deposition Modeling. Mesh Repair and modification was a primary focus, and the use of Augmented Reality technology to map data to the object was explored using Microsoft’s HoloLens device. The goal was to meaningfully represent microscopic, cellular, and subcellular brain structures in a macroscopic, physical way. This project was completed with Dr. Michael Papka as the supervising faculty mentor, in conjunction with Dr. Narayanan Kasthuri and Joseph Insley of ANL.

310 Chong Zhou, Anthony, Pickart Mohit, Patel Pawel, Such Ryan Rogerson
Digital Display for Vertical Milling Machine (Caterpillar)

Author(s): Chong Zhou
Department: Mechanical Engineering
Faculty mentor(s): Jenn-Terng Gau
Session Time: 9:00am - 10:15am

Milling machines are the backbone to modern day machine shops. They are commonly seen in the manufacturing industry for their precision in metal turning operations. Milling machines are not as expensive as computer numeric control (CNC) machines, but can still achieve comparable results. Instead, they are manually operated by a machinist. Caterpillar Inc has requested that a digital display be designed and implemented for one of their 3-axis vertical milling machines at their Peoria, IL plant. During the milling process, the cutting tool must be precisely located and tracked throughout the cutting sequence. A digital display that the team designed is supposed to show relative position between the cutting tool and the workpiece. That way, a machinist can easily and precisely work on parts. A 9 inch, high definition LCD display will provide an exact digital output visible to the machinist that can be calibrated with the push of a button. This display will be connected to a 0-9 keypad with four directional arrows, three calibration buttons, as well as enter and cancel buttons. The display and keypad will be enclosed in an aluminum casing designed and machined by the design group. This display box will house the Raspberry PI micro-controller which is capable of HDMI output, micro-USB power supply (5V), and encoder input. The display box will be mounted onto the machine via aluminum brackets designed and machined by the group. Linear encoders with resolution in the tenth of a micrometer range will be used to track the position of the table as the dials are turned. The encoders and position rails will be mounted to the machine table. Since the encoders will measure linear distance, any backlash caused by the machine wear will not cause any error in the input to the Raspberry PI processor. This controller will be programmed in Python coding using an interrupt function. Microcontroller receives the input from the encoder as a number of pulse count and converts it to the position value to the precision of ten thousandth of an inch.

311 Jeremiah Moore-Moauro
Mud and Music: A Cultural Study of Music During the Great War

Author(s): Jeremiah Moore-Moauro
Department: History
Faculty mentor(s): Andy Bruno
Session Time: 9:00am - 10:15am

The dawn of the 20th century saw the western world step into the age of modernity. New technologies changed the social fabric of countries and the nations of Europe capitalized on their new found industrial strength. Nearly all sectors of commerce saw monumental growth during this time, so it comes as no surprise that a sudden expansion of the music industry also occurred. Like most other areas, technological innovation and rising consumer culture were at the heart of its growth. The availability of phonographs, radios, and upright pianos in the home meant music was no longer an indulgence of the rich but a commodity for the common man.

On the eve of 1914, the western world re-tooled for war, producing the goods needed for the coming conflict, including
the music industry. Music halls resonated with patriotic tunes to rally the citizenry and as men of all nationalities marched to the trenches the songs of their countries came with. It is difficult to separate music from the conflict, just as gas masks have come to symbolize the war, songs like “Over There” and “Long Road to Tipperary” became its soundtrack. Historians in recent years have argued that the Great War was not really about military conquest, but the assertion of national identity; if this is true, than music will prove as essential to forging that identity as the gun is in waging war. We will see that the soldier and citizen will truly be inseparable from their music.

312  **Paula Moraga**
*Feminism in Chilean Music*

Author(s): Paula Moraga  
Department: History  
Faculty mentor(s): Dr. E. Taylor Atkins  
Session Time: 11:30am - 12:45pm

In the 1970s, Chilean female musicians were reluctant to characterize themselves and their music as “feminist,” but in the late 2000s, they have come to embrace this identity and consciousness. Government instability, the domestic feminist movement, and newly existing digital media have had a profound effect on the freedom of expression of Chilean female artists. We will take a look at what effects the unstable government had for this initial fear to exist, and the effects that digital media, as well as the advancements in the feminist movement, have had for female musicians to develop a more positive outlook on this label.

313  **Drew Lauderdale**
*A History of Polish Graphic Design in the Twentieth and Twenty-First Centuries.*

Author(s): Drew Lauderdale  
Department: Art and Design  
Faculty mentor(s): Rebecca Houze  
Session Time: 9:00am - 10:15am

This project is a visual representation and analysis of key movements and figures in the history of Polish graphic design, focusing largely on the poster. It explores the movement from the early congregation of artists in the yet-unformed modern Polish nation in the 1910’s to the emotive and vibrant landscape of contemporary professional and student works. The analysis includes a short summary of the state of contemporary affairs in graphic design, featuring the unique perspective of both American and Polish students. The historical context is complemented by visual examples to create a brief and effective overview of Polish graphic design.
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
400 Richard Arnold, Sam Wrzesinski, Kylie Moran, Candy Melara, Brooke Buttacavoli
Huskie Food Pantry

Author(s): Richard Arnold, Rachel Musial
Mentor(s): Liz McKee
Organization: Student Involvement and Leadership Development
Partner: NIU Foundation and the Huskie Food Pantry

The purpose of the Huskie Food Pantry is to alleviate food insecurity across the campus of Northern Illinois University. To do so, we have worked collectively with the DeKalb/NIU community. As interns, we have developed partnerships with Aldi, Hy-vee, Target, and Jewel-Osco. Most recently, we have worked with the NIU Foundation to create a Huskie Food Pantry giving campaign. The Huskie Hunger Campaign was designed to raise money for general costs facing the pantry. This is similar to the Thanksgiving fundraiser we ran last November to provide students with festive meals during the holiday. These collaborations have helped bring a sustainable stream of food to our users, and given us invaluable experiences that will be use throughout our careers. These projects are just the beginning of what we, as interns have been working on.

401 Ashley Grazutis, Pablo Bernal, Jourdan Gardner, Tristan Rodriguez
Coding: How it Benefits the Community

Author(s): Ashley Grazutis, Pablo Bernal, Jourdan Gardner, Tristan Rodriguez
Mentor(s): Sara Finnigan, Debbie Pixton
Organization: NIU Service Leaders (Office of Student Engagement and Experiential Learning)
Partner: NIU Center for P-20 Engagement

The Huskie Hack is a hackathon held every year at NIU. A hackathon is an event where people who write, translate or assign codes (coders) interact with the concepts of programming, collaboration and critical thinking in order to solve problems. The Huskie Hack gives coders a platform to share their ideas and get them critiqued by experienced coders. The Huskie Hack is significant because it gives coders the opportunity to create applications using sequences of symbols that can be understood by a computer in order to assist in making every day activities easier. The goal of this project was to find out how coding benefits the community the most. In order to find this out, our team volunteered at the Huskie Hack in order to observe coders working on their projects. Then, our group viewed all the project submissions on a website looking for what the goal of each project was and what area of society the project was trying to improve on. We found that coding applications were created the most in the entertainment and communications industries, and it benefits the community the most in these areas. We discovered that the goal of coding is to advance technology in order to help the community to function more efficiently. For the future, we can use this finding to implement the products created in order to serve our communities more effectively.

402 Faith Mellenthin
Co-op Gallery

Author(s): Faith Mellenthin, Leyla Puskar, Samantha Jones
Mentor(s): John Siblik, Jessica Labatte
Organization: School of Art and Design Student Advisory Committee

Developing the student collective so that students will volunteer to sustain the effort, and have there work displayed and available for purchase. Research co-ops and how they work to draft by-laws. The project develops outreach to NIU and the DeKalb community as well as current audience in the School of Art and Design. The project links the current 9 students art organizations through the use of the School of Art and Design Student Advisory Committee.

403 Nicole Wagner
Analyzing impacts of bison wallows on prairie plant communities

Author(s): Nicole Wagner
Mentor(s): Nicholas Barber
Department: Biological Sciences
Partner: Nachusa Grasslands-The Nature Conservancy

Historically in North American prairies, bison were an important factor in maintaining prairie plant communities. Bison play a key role in prairie restoration as they create natural disturbances through trampling, grazing and wallowing that
shape plant communities. Because of this, bison have been considered a keystone species. Previous studies provide evidence that wallowing can aid prairies, through seed dispersal and soil enrichment furthering vegetation communities and plant species diversity. This research will be carried out at Nachusa Grasslands, where plants in and around active and abandoned wallows will be surveyed to determine (1) how wallowing changes communities and soil conditions compared to surrounding areas and (2) if plant and soil conditions return to their previous states after wallows are abandoned. I will survey random 1 m2 plots within wallows, along wallow edges, and in surrounding prairie to identify plants and quantify species richness, percent of plants, Non-native and invasive species abundance, and diversity. I will measure soil compaction, temperature, pH, and moisture in each plot. I hypothesize that within the wallowed sites there will be a larger amount of bare ground cover, fewer plants, and more variation, such as distribution of graminoid plants, which are more dependent on small scale disturbances compared to adjacent prairie. Non-native and invasive species are predicted to be more abundant within the wallowed sites, which can be useful for land managers to determine land practices for further management strategies.

404  Destani Boyd, Abby Vidal, Kristen Amstutz

*Promoting literacy and resources for youth reading.*

Author(s): Destani Boyd, Abby Vidal, Kristen Amstutz, Ali Kaveh  
Mentor(s): Susan Massey  
Organization: NIU Service Leaders (Office of Student Engagement and Experiential Learning)  
Partner: Jerry L. Johns Literacy Clinic

According to the U.S Department of Education (1996), up to 61% of low-income families do not have any books at home for their children to read. Higher-income neighborhoods roughly have ten times greater access to reading material than low-income neighborhoods (Neuman & Celano, 2001). The Jerry L. Johns Literacy Clinic, aims to address this problem with a literacy organization, called Little Free Libraries. The Little Free Libraries is a take a book, leave a book non-profit organization that begin in 2009. “The Little Free Libraries motto is to share good books and bring communities together” (LFL.org). Our project examines how the Little Free Libraries organization is currently being implemented at the Jerry L. Johns Literacy Clinic. This will be done by primarily focusing on the registration, design and installation process of opening two new Little Free Libraries in the DeKalb/Sycamore community. In addition, we are developing a marketing and promotional plan for the existing seven Little Free Libraries sponsored by the Jerry L. Johns Literacy Clinic.

405  Michael Tackes, Casey Trent, Mike Sooky

*Growing Concern*

Author(s): Michael Tackes, Casey Trent, Mike Sooley  
Mentor(s): Melissa Burlingame, Michaela Holtz  
Organization: Communiversity Gardens  
Partner: Huskie Food Pantry

People in DeKalb County, NIU, and the surrounding communities either live in a food desert or are food insecure. These people need access to fresh produce in order to live a healthier lifestyle. This project is important because it strives to lessen food struggles within our community. The problem that the Communiversity Gardens attempts to solve deals with food insecurity in the NIU student population and surrounding community. This is related to students not having easy access to fresh food. This is done by providing increased access to local fresh food and alleviate struggles associated with food deserts. Education is also provided relating to sustainable farming practices and the importance of local food production. By increasing outreach and awareness of the program this allows more food to be provided to the people that really need it. This is done through events and fundraisers which help to keep the community engaged. In the 2015 season we provided more than 1700 pounds of produce for food pantries in DeKalb County. In conjunction with DeKalb County Community Gardens, we have grown fresh produce for the past three growing seasons. Here at NIU, on average 80-100 students frequent the Huskie Food Pantry every week. The results conclude that the NIU Communiversity Gardens have proven to feed the NIU student population with fresh produce. This has shown that students need fresh produce and the service we provide is valued. Future plans include expanding the garden, which will allow us to feed more students and increase our variety of vegetables.
406  **Samuel Millard, Brandon Pieczynski**  
*Green Team Process Clarification*

Author(s): Samuel Millard, Brandon Pieczynski  
Mentor(s): Melissa Burlingame  
Organization: NIU Green Team

When it comes to environmental initiatives on campus, or trying to get anything done on campus for that matter, one of the biggest obstacles people encounter is being forced to ask “how do I do this?”. The general lack of easily accessible information about how the bureaucratic process at NIU functions has led to confusion, frustration, and loss of determination among students and staff who want to see their projects and ideas for a better campus come to fruition. The main goal of our research has been looking into closing this knowledge gap between those who want to bring positive change to our campus and those who can help them achieve that goal. As part of this work with the NIU Green Team, we have also been looking into how other public Illinois universities have been so successful at implementing their own sustainability initiatives and how we can incorporate this knowledge into the development of our own sustainability plan. The end goal of our research will be to prepare a guidebook that will help students and faculty alike to develop, refine, and implement their own initiatives for the benefit of the whole campus.

407  **Betsania Salgado, Ainsley Galvez, Estefani Rosas-Almanza, Talia Barreto, Xavier Gonzalez**  
*Latinos in Higher Education*

Author(s): Betsania Salgado, Ainsley Galvez, Estefani Rosas-Almanza, Talia Barreto, Xavier Gonzalez  
Mentor(s): Angelica Mendoza  
Organization: Huskie Service Scholars (Office of Student Engagement and Experiential Learning)  
Partner: Latino Resource Center

According to the U.S Census, in 2012, the Latino population made up 16.9% of the U.S population. As the Latino population increases, there needs to be a larger investment in their future. Educational programs such as Parent University, where parents learn about ways in which they can help their children go to college, is very much greatly needed. Parents of first-generation college students are overwhelmed and confused about what exactly is expected from universities in order for their child to attend. Through our involvement with Parent University, we hope to help parents support their child academically by teaching them about resources in their community. Additionally, we assisted with childcare, homework help, and interactive school activities. An open ended survey was used to know what the parents learned, what they liked, and what improvements could be made with the program. The answers from the survey demonstrated that the program was of big help. Conclusively, programs like Parent University are of great need in the Latino community and there should be more of them available for parents and students.

408  **Theodore Abgemanple, Vanessa Saldana, Amie Kahovec, Nick Casas**  
*Examining the Effects of a Mentor Centered Tutoring Program*

Author(s): Theodore Abgemanple, Vanessa Saldana, Amie Kahovec, Nick Casas  
Mentor(s): Nelisha Gray, Jennifer Charles  
Organization: NIU Service Leaders (Office of Student Engagement and Experiential Learning)  
Partner: Sycamore High School

This study intends to help efforts to increase levels of comprehension of class materials by offering regularly scheduled tutoring sessions to students attending Sycamore High School. The effects of the work conducted were studied through analyzing survey responses from students who were introduced to the researchers by Sycamore staff. Being able to identify aspects of tutoring most fruitful to student confidence would assist educators struggling to incorporate successful programs designed to enhance student capability. Research was conducted over four months to determine which aspects of tutoring and mentoring had the greatest perceived effects on student capability regarding various subjects including: confidence, organization, motivation, and participation. Students were offered sessions to discuss classes across all disciplines to help foster improvement and establish organization techniques. The small student sample provides an insufficient amount of conclusive data to support clear perceived effects resulting from the sessions. Although unsuccessful in the study, the efforts to help the students seek assistance when encountering difficult subjects was successful. Furthermore, the surveys suggest the respondents have discovered new problem-solving techniques and feel motivated to attack future academic challenges.
409  Andria DeBerry, Sade Lyles  
*Beginning Alliances*

Author(s): Andria DeBerry, Sade Lyles  
Mentor(s): Molly Holmes  
Organization: NIU Service Leaders (Office of Student Engagement and Experiential Learning)  
Partner: Gender and Sexuality Resource Center

Our campus Gender and Sexuality Resource Center is home to many students who are part of the LGBTQ community. The LGBTQ community is one, among many other, marginalized groups in America. Marginalization involves placing people in an unimportant and powerless position within a society, and brings with it, isolation, degradation, and complete mistreatment of many groups. The purpose of our project is to combat the concept of marginalization by exploring issues faced by members of marginalized groups and identifying actions of support that can, in small steps, increase ally-ship. Allyship is the practice of unlearning and relearning, and begins when a person of privilege seeks, in a lifelong process, to support and build relationships based on trust, consistency, and accountability with marginalized individuals or groups. We will be conducting interviews with members of the Black, Latino, Asian, and LGBTQ communities to further understand issues faced in marginalized groups, and the actions of support they prefer. We found that members of marginalized groups deal with numerous issues such as physical and emotional violence, and identified respect, creating awareness, and educating one's self as some of the actions people can take to support their group. We concluded that these actions of support, along with others need to be present to begin an ally-ship on our campus. We are preparing to create posters, which will advocate ally-ship and present the preferred actions of support. Increasing alliance, through our project, will call forth equal support, comfortability, and acceptance of students on our campus belonging to marginalized groups.

410  Laura Vivaldo Cholula, Edgar Lopez, Luis Delgado, Nancy Hernandez, Kassandra Ramirez  
*The Importance of Area Studies*

Author(s): Laura Vivaldo Cholula, Edgar Lopez, Luis Delgado, Nancy Hernandez, Kassandra Ramirez  
Mentor(s): Sandy Lopez  
Organization: Huskie Service Scholars (Office of Student Engagement and Experiential Learning)  
Partner: Hope Haven

The purpose of our project is to determine the importance of Area Studies. Area studies is a multidisciplinary or interdisciplinary study of specific geographical areas of the world. As part of our project, we conducted a literature review to determine the importance and benefits of Area Studies. Our project surveyed scholarly articles, books, and other materials related to the topic. Overall, Area Studies programs can enhance student's critical thinking skills and prepare them for an increasingly diverse workforce. Furthermore, we will present the benefits of Area Studies to incoming and current NIU students in an effort to encourage students to enroll in an Area Studies program.

411  Ashley Sands, Kimberly Escamilla, Shawnadrea Hill  
*At Risk Youth: Perceptions on Goals and Education*

Author(s): Ashley Sands, Kimberly Escamilla, Shawnadrea Hill, Carol Vest  
Mentor(s): Nelisha Gray  
Organization: NIU Service Leaders (Office of Student Engagement and Experiential Learning)  
Partner: Clinton Rosette Middle School

This community service project sought to encourage middle school students at Clinton Rosette Middle School (CRMS) to complete their education in high school once enrolled and earn a post-secondary degree afterwards. This project focused solely on at-risk youth who are in STEP: a program designed to help at risk youth with their individual needs. We talked about career and education related topics to help students think more about their future. We conducted pre and post interviews to see if their attitudes towards continuing their education changed. We expected that once we got them thinking more about their future, their attitudes and thoughts in continuing their education would change. This impacts the community because it shows students that continuing their education can be a rewarding experience and it encourages them to work hard to attain their goals.
412  Jennifer Gijada, Diamond Brown, Brian Lopez  
*Huskie Food Pantry*

Author(s): Jennifer Gijada, Diamond Brown, Brian Lopez  
Mentor(s): Nelisha Gray, Michaela Holtz  
Organization: Huskie Service Scholars (Office of Student Engagement and Experiential Learning)  
Partner: Office of Student Engagement and Experiential Learning

My group worked with the Northern Illinois University’s Food Pantry. The food pantry is where students living off campus are able to get groceries for free every Thursday night. Nationwide, students face food insecure including our very own NIU campus. Our project is to help provide to those students who face food insecurity. Our plan is to set up boxes throughout the residence halls and hopefully with the help of advertisements, allow our students and faculty to donate food to the Huskie Food Pantry. Not only will this project allow many of our NIU community to help out our fellow students with food insecurity, but it will attempt to hopefully set up some sort of foundation of donation for the Huskie Food Pantry.

413  August Bryan, Andy Cozzi, Keeayla Jones  
*NIU STEM Saturdays: Parental influence of STEM exposure.*

Author(s): August Bryan, Andy Cozzi, Keeayla Jones  
Mentor(s): Jeremy Benson, Pettee Guerrero  
Organization: NIU STEM Outreach

Working with NIU STEM Outreach it became very clear that extracurricular STEM education is important for the youth community. Data, such as Harvard’s 2016 parent/child STEM discussion research, pours in every year that introducing children to STEM outside of school has overwhelmingly positive effect. Problematically, many children and young adults are still not getting involved in STEM education or career paths. Understanding that STEM Saturday is an ideal means of introducing students to STEM we sought to discover if only families in STEM backgrounds introduce their children to STEM outside school. The results show that the extreme vast majority of students enrolled in STEM Saturdays come from pre-existing STEM backgrounds and that marketing needs to shift to breaking any stigmas that stop non-STEM parents from introducing their children to the sciences.

414  Megan Sneyd  
*Green Team Communications*

Author(s): Megan Sneyd  
Mentor(s): Melissa Burlingame  
Organization: NIU Green Team

As sustainability and environmentally conscious practices become more important to the general public, it is critical that information regarding sustainability at Northern Illinois University be publicized and widely available. NIU has a long history of implementing sustainable practices throughout their campuses, but this information is often difficult to find and not well known. In order to make information more accessible to the public, the NIU Green Team decided to focus efforts on promote knowledge on the various sustainability initiatives that are taking place at NIU. This has been accomplished by releasing press releases regarding the Green Team and sustainability through NIU Today to reach a wider audience and by revamping the sustainability website to be more navigable and contain more up to date information.
Poster Assistance:
Creative Services

URAD Assistance:
Wade Duerkes & the Photography team
Mark McGowan, Division of Marketing and Communications
Tom Parisi, Media and Public Relations
Kevin Meyer, Creative Services
Jeanne Ratfield, Office of the Vice Provost
Patti Gingrich, Holmes Student Center
Mike Strunk, Holmes Student Center
Abby Lund, Office of the Vice Provost
Taylor Hayden, Division of Marketing and Communications
Kathy Blair, NIU Foundation
Jon Sentovich, NIU Foundation
Sophia Varcados, Creative Services
NIU Document Services
Northern Lights Ambassadors volunteers

CES Assistance:
Michaela Holtz, Office of Student Engagement and Experiential Learning
Liz McKee, Student Involvement and Leadership Development
Molly Holmes, Gender and Sexuality Resource Center
Sandy Lopez, Center for Southeast Asian Studies/
Center for Latino and Latin American Studies
Angelica Mendoza, Latino Resource Center
Susana Das Neves, Parent University
Pettee Guerrero, STEM Outreach
Jeremy Benson, STEM Outreach
Sara Finnigan, Center for P-20 Engagement
Debbie Pixton, Center for P-20 Engagement
Tracy Rogers, Center for P-20 Engagement
Susan Massey, Jerry L. Johns Literacy Clinic
Ali Kaveh, Jerry L. Johns Literacy Clinic
Tammy Judkins, Clinton Rosette Middle School
Carol Vest, Clinton Rosette Middle School
Erin Meier, Clinton Rosette Middle School
Tim Vincent, Clinton Rosette Middle School
Jennifer Charles, Sycamore High School
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