2018 UIC

STUDENT RESEARCH FORUM & IMPACT DAY
Undergraduate • Graduate • Professional

April 11th, 2018
1:00 PM - 5:00 PM
UIC Forum
725 West Roosevelt Road
Chicago, IL 60608
# Student Research Forum & Impact Day

**April 11, 2018**

## Schedule

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<th>Time</th>
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<tr>
<td>11:30 to 1:00 pm</td>
<td>Judges and Students registration and set-up</td>
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<td>1:00 to 3:30 pm</td>
<td>Poster viewing and judging session</td>
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<td>3:30 to 4:30 pm</td>
<td>Reception</td>
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<td>4:30 pm</td>
<td>Awards presented</td>
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Acknowledgements

SRF and Impact Day Planning and Implementation Committee:

Luisa DiPietro  Associate Vice Chancellor for Research
Laura Junker  Associate Dean, Graduate College
Sara Hall  Director, Office of Undergraduate Research
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Linda Naru  Assistant Dean, Library
Crystal Patil  Associate Dean of Academic Affairs, Honors College
Jill Rothamer-Wallenfeldt  Director, UIC Experience

Cover images (top to bottom) are selected from the 2017 UIC Image of Research Competition:

*Peripheral Visual Function: Accessing the Unexplored*, Shresta Patangay, Bioengineering
*Surprise Symphony*, Michaela Tures, Graphic Design
*Intelligent Welding*, Alexandra Basantes Defaz, Materials Engineering
*The Phenotypic Plasticity of Pristimantis mutabilis*, Chun Chun Ng, Biomedical Visualization

The Images of Research Competition is sponsored by the Graduate College and UIC Library

We would also like to thank the Graduate College for providing the PowerPoint presentation of the Images of Research which can be seen throughout the competition in Main Hall ABC.
2018 Student Research Forum and Impact Day Sponsors

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Student Research Forum

Poster Presentations
1. **Abdulbaseer, Ummesalmah** and Papautsky, Elizabeth Lerner

**The Patient’s World In Critical Care: People, Spaces, And Processes Of Family’s Interactions**

*Undergraduate - Psychology*

Much literature has explored the complexity of healthcare environments with a focus on clinician performance. However, limited examination exists of this complexity with the consideration of the patient and family role. Based on 50 hours of observations on a Medical Intensive Care Unit, we describe the roles, physical spaces, and processes associated with critical care with a focus on the patient and family’s interactions with clinicians and staff. Given that often in critical care environments, patients are incapacitated and cannot play an active role in their care, communication and decision making responsibilities shift onto their family members. Thus, if engaged, families must navigate a complex environments of multiple roles of providers to both receive and deliver information, along with making decisions regarding patient care. In addition to representing environmental complexity around the patient, we present potential challenges and begin to think about implications.

2. **Abera, Helen** and **Flores-Gonzalez, Nilda**

**Latino/a Millenials Under Trumps Administration**

*Undergraduate - Liberal Arts and Sciences*

This paper explores the impact of Trump’s election in 2016 on Latino millennials and how they understand their social position within the United States. This study is based on 10 interviews conducted with Latino youth living in the Chicagoland region. Interviews were conducted with Latino youth in order to examine Latino youth’s sense of belonging within the United States in an increasingly nativist climate. These interviews focused on gauging how these Latinos/as’ racial experiences have been impacted following the Trump election with a particular focus on how Latina youth in this study perceived themselves in regards to race, ethnicity, citizenship and being real Americans. The young millennials in this study discussed different experiences with discrimination, experienced both prior to and following the Trump election which further exacerbates their feelings of belonging and citizenship within the United States. Therefore, my findings suggest discrimination plays a significant role in the Latino/a experience.

3. **Aburmishan, Omar**

**The New Age Of Political Satire**

*Undergraduate - Political Science*

Research question: Do college students learn more about what goes on in today’s political climate from classrooms on the subject or watching political satires shows? Do UIC students
learn best when they are informed and entertained at the same time? Why or why not?

Argument: For this capstone project, I plan to argue that more and more people today, especially millennials particularly at the University of Illinois at Chicago are more informed on political and social issues that impact their lives by viewing television programs that involve political satire. Shows such as: The Daily Show with Trevor Noah, Conan, Chelsea, Real Time with Bill Maher, Last Week Tonight with John Oliver, The Jim Jefferies Show, The Late Show with Steven Colbert, Full Frontal with Samantha Bee, Late Night with Seth Meyers, and Jimmy Kimmel Live! These shows are some of the most popular late-night television programs that people tune into for their news on what’s going on in the world. I’d argue that UIC students learn best from these programs more than they do in the classroom because they all have one thing in common; they educate while making you laugh. Why I chose UIC students: After getting to know a wide variety of students at UIC who I have learned so much from over the last 3 and ½ years I felt that I could learn more about them in order to find out where they stand on certain issues. UIC has some of the brightest, sharpest, and most informed students in the country. The UIC Political Science majors are the most active in many political and cultural organization due to them being aware and informed on a lot of issues that impact their lives.

4. Abuyousef, Rame; Stone, David E. and Statler, Bethanie-Michelle

Creating an In-Cell Sensor for the Activated Pheromone Receptor in the Yeast Mating Response

Undergraduate - Biological Sciences

Chemotaxis and chemotropism are important processes that many organisms use to move and grow in response to chemical stimuli. The human inflammatory response and metastasis use chemotaxis to move. The budding yeast, Saccharomyces cerevisiae, is a well-studied eukaryote that uses chemotropism to grow during their mating response. The yeast mating response is the best studied eukaryotic chemotropic model. Despite dramatically different outputs, both chemotactic and chemotropic cells must solve similar problems: detect shallow gradients and then polarize their cytoskeleton to grow or move. Budding yeast use sexual reproduction and meiosis to switch between haploidy and diploidy. Haploid yeast have two mating types, and each secrete a pheromone that binds to the G-protein coupled receptor (GPCR) of the opposite type. Ste2 is the GPCR on MATa cells that detects α-factor secreted by MATα cells. Ste2 is uniformly distributed on the membrane of MATa cells. Pheromone binding to the receptor causes the G-protein to dissociate into G subunit and free G subunit. The receptor is globally phosphorylated and internalized. The receptor polarizes in a crescent at the default site before tracking to the chemotropic site. At the leading edge of this crescent, we hypothesize that there are more active unphosphorylated receptors, and inactive phosphorylated receptors at the lagging edge. This differential phosphorylation between the leading and lagging edges allow the crescent to track from the DS to CS. To test that, we use an in-cell sensor that allows us to see where specific protein species are located and how their localization change overtime using time-lapse imaging. We use Rod1, a member of the arrestin family, to create a sensor using general cloning
techniques followed by live-cell fluorescent imaging. We hypothesize that Rod1 binds to the phosphorylated receptor and therefore we expect it to localize to the lagging edge of the receptor crescent.

5. **Ackerman, Max; Dash, Chiranjeev; Muthra, Sherieda; Hamilton, Rhonda; Mooney, Dale; Leopold, Katherine; Wu, Maggie; Dodson, Everett and Adams-Campbell, Lucile**

**Assessment of Oral Health Literacy Among African Americans in Washington, D.C.**

*Undergraduate - Minority Health and Health Disparities Research*

Oral health literacy (OHL) is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate oral health decisions." Poor periodontal health has been shown to associate with an increased risk of cancer and heart disease. Oral health disparities are well documented among minority populations, while literature regarding the OHL of minority populations, specifically African Americans (AAs) in Washington, D.C., is less substantial. The purpose of this study was to measure the OHL of a sample of AA adults in Washington, D.C. using two previously validated OHL tests (Rapid Estimate of Adult Literacy in Medicine (REALD-30) and Comprehensive Measure of Oral Health Knowledge (CMOHK)); determine the level of association of CMOHK and REALD-30 with regards to various demographic factors, self-reported oral health behaviors, and clinical oral health status; and define the level of agreement between the two instruments. Participants were recruited from three public-housing community centers and completed the CMOHK, REALD-30, and a demographic survey. Tertiles were calculated to determine distributions for poor, fair, and good scores, and Cohen's simple kappa coefficient was used to determine agreement between CMOHK and REALD-30. The study sample (n = 44) was described as having a fair level of OHL. Education level (with REALD-30) and daily flossing (with CMOHK) were found to be associated with OHL. Oral health literacy measurements from the REALD-30 and CMOHK instruments did not correlate at a high percentage (14.7%) (95% CI = -6.94% - 36.3%).

6. **Adams, Samantha; Berenz, Erin and Ranney, Rachel**

**Proposing an Enhancer to Prolonged Exposure and Cognitive Processing Therapy for Individuals Suffering from PTSD**

*Undergraduate - Psychology*

Post-Traumatic Stress Disorder (PTSD) is a mental health disorder that some people develop after experiencing traumatic events, such as a natural disaster, sexual assault, war, etc. PTSD is associated with impairment in multiple areas of life functioning, including work and family life. The gold standard therapy for PTSD is Cognitive Behavioral Therapy (CBT); however, a minority of individuals who receive CBT will continue to meet criteria for PTSD. Therefore, research on alternative treatments is needed. A relatively new field of psychology is Animal-
Assisted Therapy (AAT). AAT focuses on bringing animals into therapy sessions to help individuals relax or to use as a reference for the individual’s emotions. This proposed paper will aim to define PTSD, summarize existing treatments for PTSD, review the literature on AAT, and evaluate the support for the use of AAT as a treatment for PTSD. Finally, I will propose areas for future research in this field.

7. Adenaya, Phebean

Is There Any Concordance in the Methylation Signatures Between Cadmium and Aging? If So, What is the Biological Significance in Relation to Longevity?

Undergraduate - Pathology

Environmental cadmium overburden produces adverse health effects. Cadmium exposure through contaminated food and smoking has been linked to initiating cancer, kidney damage and other health issues. Several studies on mice and women have shown that there is a link between cadmium, aging and DNA methylation. The link between decreased longevity and cadmium overburden may be changes in DNA methylation that is seen in both. Therefore, this study will focus on gathering different articles that address this association to determine if there is a significant overlap in DNA methylation changes in these two groups. If the methylation patterns of aging and cadmium overburden are similar, then one could pursue the hypothesis that cadmium induces early aging. However, if the methylation patterns are not similar, it would be unlikely that cadmium affects longevity through DNA methylation. Our literature survey has shown several articles that support the hypothesis that DNA methylation patterns of cadmium and aging coincide. For example, LINE-1 hypomethylation, a biomarker of aging was also associated with high urinary cadmium in Argentinean women. A study conducted by Virani et al (2016) in Mae Sot, Thailand, a place with high levels of environmental cadmium exposure reported that cadmium is associated with DNA methylation markers such as DNMT3B and LINE-1. There were differences according gender and smoking status. Even though studies in mice show cadmium has an effect on longevity, but it is unknown if this effect is due to DNA methylation.

8. Adie, Sara

Automated Algorithm for Analyzing Progressive Goldmann Visual Field Loss

Undergraduate - Electrical and Computer Engineering

The Goldmann visual field (GVF) is a well-proven method of diagnosing and monitoring patients with ocular disease of the retina and optic nerve. A visual field is a graph that illustrates the boundaries of a patient’s vision. It is obtained by a technician and subjectively interpreted by ophthalmologists who estimate the results of the readout of the test. Ophthalmologists rely on comparing numerous visual field tests of a patient over time for management of the disease. Our aim in the overall project is to remove one layer of subjectivity associated with the GVF by
automating specific parameters in the readout of this diagnostic test. This would be completely a software driven solution, applicable to any electronic image of a GVF, that can give accurate measurements of progression/regression in the visual field test. As a proof-of-concept, a MATLAB program was developed to analyze the GVF by calculating the area indicated within the visual field boundaries specified. By exporting the MATLAB program into a .exe file, this diagnostic tool can be used by ophthalmologists at any institution utilizing the GVF for easy, quick, and accurate analyses of their patients’ GVF tests.

9. Agu, Uzoma; Balyan, Arjun; Ece, Eksi and Orenic, Teresa

Hox Proteins and Bristle Formation in Drosophila Legs

Undergraduate - Biological Sciences

The overall goal of our research effort is to understand how Hox genes generate morphological diversity among serially homologous structures legs of the Drosophila adult. Hox genes encode a group of conserved transcription factors that are essential for animal development and have been implicated in human diseases. A close observation of Drosophila legs revealed a distinct difference in the formation of mechanosensory bristles pattern (mCs) in the T1 and T3 legs vs the T2 legs. In the T2 leg, the mCs bristles are arranged into longitudinal rows (L-rows) along the circumference of the tibial and tarsal segments. In addition to the L-rows, a subset of mCs on the T1 and T3 legs are organized into transverse rows (T-rows), which are found in defined positions within the tibial and the most proximal tarsal segment (the basitarsus). Previous research has shown that Hox proteins, Sex comb reduced (Scr) and Ultrabithorax (Ubx) are essential for the formation of T-rows in the T1 and T3 legs respectively. Scr is expressed in all cells of the T1 legs, but its expression is specifically upregulated in the primordia of T-row mCs. Similarly, upregulated Ubx expression marks the T-row primordia of T3 legs. My focus is on the function of Scr in T1 legs in regulation of the Delta (Dl) gene, which is essential for mC patterning and on the regulation of Ubx expression in T3 legs. Dl is expressed in the primordia of L-row mCs, but its expression is extinguished by Scr in the T-row mC primordia. The first aim of my investigations is to determine whether Sc regulation of Dl occurs at a transcriptional or post-transcriptional level. To address this question, I will examine how a Dl reporter gene, which reflects the transcriptional activity of the gene, responds to gain of Scr function. A second aim is to gain insight into the how upregulated expression of Ubx is established in T3 legs. Genetic studies suggest that the leg patterning protein Distalless (Dll) is required for upregulated Ubx expression. I will ask whether the Dll might act as a direct regulator of Ubx expression by testing the function of putative Dll-binding sequences in a Ubx cis-regulatory element that directs expression in legs. I hypothesize that Scr regulates Dl at a transcriptional level and that Dll acts as a direct activator of Ubx expression. These investigations will provide generally relevant insights into Hox gene function and regulation.
10. Ahmed, Sofia

**Functional Characterization of OPr Gene in Drosophila via Larval Tracking and Locomotor Behavioral Analysis**

*Undergraduate - Biological Sciences*

The goal of this research is to determine if larvae of Drosophila melanogaster (fruit flies) display hyperactive behaviors when a gene called Optimus Prime (OPr) is deleted. This gene is thought to modulate glutamate receptors in neuromuscular junctions. Deficits in the human homolog of this gene are related to autism, bipolar disorder, depression, and other disorders. In this study, samples of wild type and null mutant larvae were placed in a gel arena, and allowed to wander freely for ten minutes. With the use of video-tracking software, various parameters of the locomotor activity of these larvae were extracted. These parameters include the total distance movement, mean velocity, mean angular velocity, meandering, and more. We found a significant difference in the total distance moved, mean velocity, and angular velocity of the two genotypes, with the null mutants being significantly lower. No difference was found in terms of total rotations and meandering.

11. Akbany, Abeer

**Function of Vps-39 Gene in C. Elegans**

*Undergraduate - Biological Sciences*

The vps-39 gene regulates Tomosyn in C. elegans in the nervous system, because of the role it plays in synaptic transmission. This is a highly regulated process that requires the formation of essential fusion machinery, composed of three highly conserved Snare proteins—Synaptobrevin, Syntaxin, and SNAP 25. Disruption of this snare complex formation completely eliminates synaptic transmission. In the Richmond Lab, a regulator of Snare complex formation called Tomosyn has been characterized. In the Tomosyn loss of function mutants, more snare complexes formed, and neurotransmission was enhanced. In the effort to understand how Tomosyn levels are regulated, a Yeast-2-hybrid screen was conducted, which identified vps-39 as a potential Tomosyn binding partner. I acquired two mutant alleles of the vps-39 gene, in order to study the effect of the consequences in terms of synaptic transmission. Preliminary data showed that in vps-39 mutants, Tomosyn expression was reduced. We hypothesized that vps-39 mutants should phenocopy Tomosyn loss of function and enhance neurotransmitter release. This was tested using a pharmacological assay using Aldicarb on intact worms. The results of this study suggest that vps-39 has a mild effect on synaptic transmission, possibly due to the residual Tomosyn levels.

12. Withdrawal
13. Alattar, Sara

Racial Disparities in Long Term Cardiovascular Disease After History of GDM and Hypertension

*Undergraduate - Biological Sciences*

During pregnancy, women are at risk for various cardiovascular conditions and metabolic complications, such as gestational diabetes and hypertension. Gestational diabetes is known as a condition in which a woman develops diabetes specifically during pregnancy. Gestational hypertension is when a woman in pregnancy presents a blood pressure greater than 140/90 mm Hg while not presenting any other signs of pre-eclampsia. Both gestational diabetes and hypertension have risk factors that are biological, as well as other factors including patient history, age of pregnancy, and previous cardiovascular and metabolic conditions. Previous studies have shown that women with gestational diabetes mellitus (GDM) are at a significantly higher risk of developing hypertension. (Tobias) Additionally, hypertensive disorders in pregnancy are associated with an increase in likelihood of long term cardiovascular disease. (Black) Studies have shown that there are ethnic and racial disparities in the development of hypertension and GDM due to many various factors (Jacober). Public health researchers have begun to explore the various reasons for which there may be such disparities. This study, using secondary data analysis, analyzed the racial disparities in the likelihood of long term cardiovascular disease when a woman presented GDM and hypertension during pregnancy, and found some disparities in the statistics studied. This research may have useful implications in guidance for specific, useful, culturally sensitive interventions.

14. Alkadmani, Einas

The Role of Urgent Cares on decreasing the US health Care System Shortfalls

*Undergraduate - Business Management*

America doesn’t have the best health system in the world; however, we actually pay the highest annually amount of money per person on health care comparing to other developed nations (Brink, 2017). So, whom should be blamed on the insanely high medical prices and other shortfalls? What is the suggested solution to decrease their shortfalls? What are urgent care, how do they work, and how could they help with decreasing the US health care deficits? This project will demonstrate a time line of how the US system have changed over time, and the reasons that influenced these changes. It collects statistical information about Urgent cars spread around neighborhoods, and comparison chart between a visit to an emergency room in a hospital versus an urgent care visit. The points that I’m going to compare is: Cost of visit, duration of visit, quality level of care, follow ups, and insurance acceptance. Projecting a future for the Urgent Cares and their potential for improvement?
15. Alvarez, Alex and Gordon, S, Howard

Comparing Doctor-patient Communication among White and African-American Veteran Patients

*Undergraduate - Psychology*

Background: Due to the widespread differences and contrasting standpoints that our diverse society holds, research on cultural competence in the context of doctor-patient communication is a valuable investment. African-Americans report poorer experiences receiving healthcare when compared to the White majority (Smedley, Stith, and Nelson, 2003). Some disadvantages include poorer communication with their providers, less trust in their physicians and medical system, and greater experiences of discrimination within the healthcare setting (Burgess et al., 2013).

Objective: The impetus for this study therefore is to compare doctor-patient communication among White and African American Veteran patients. The study plans to examine transcripts of doctor-patient visits for differences in three crucial components within doctor-patient communication: the development of empathy, the use of open-ended questions, and active patient participation. Method: The sample of the current research involves patients from the Jesse Brown VA Medical Center. The sample size includes 10 patients whose doctor-visit transcripts will be accessed. The transcripts will be coded using the three selected components of doctor-patient communication: the development of empathy, the use of open-ended questions, and active patient participation. Transcripts will be coded via Atlas.ti, a qualitative database.

Results: Data is currently being collected. Conclusion: Findings will serve to inform how doctor-patient communication among White and African American patients differ. In addition, findings will highlight the presence/absence of the three chosen components of doctor-patient communication.

16. Andonopoulos, Franziska

“The Violence of Birth: The Aztec Goddess Coatlicue as Archetype of Procreative Sacrifice”

*Undergraduate - Gender and Women's Studies*

Pre-Hispanic Aztec attitudes towards birth were complex in ways the early colonial-era textual accounts only begin to hint at. However, an analysis of stories and imagery involving goddesses associated with childbirth can help illuminate aspects of childbirth and its relation to broader mythic, ritual, and cosmological concerns. Focusing on the monumental sculpture of Coatlicue—the mother of the Aztec tribal deity, Huitzilopochtli—as well as the account of her story from the sixteenth-century Historia general de las cosas de la Nueva España by Bernardino de Sahagún, this paper argues that childbirth was understood as a moment of necessary violence, and as such was conceptually conflated with war, sacrifice, and bloodletting rituals. Although the identity of this statue as Coatlicue has been questioned by a number of scholars, many of the proposed alternatives are also intimately related to childbirth. Acknowledging the fluid identities held by many Aztec deities, the ambiguity of this sculpture’s identity may have been intentional, with
multiple supernatural entities associated with childbirth being conflated into a singular representation.

17. Andreas, Elizabeth; Bond, Samantha; Lebowicz, Leah and Young, Christine

**Designing an eLearning Tool to Normalize Perinatal Mental Health Disorders and Increase Help-Seeking Behaviors**

*Graduate / Professional - Biomedical Visualization*

Perinatal depression is the most frequent pregnancy complication and the leading cause of maternal death. It is a serious public health concern with high-risk consequences that directly affect at least 12-25% of women. Despite its frequency, perinatal depression remains under-diagnosed. The stigma surrounding perinatal depression is one barrier that deters women from discussing the issue and seeking help from healthcare professionals. This study created a multimedia educational tool for the Center for Women’s Health patient population in an effort to increase women’s understanding of perinatal mental health disorders, decrease stigma surrounding the conditions, and increase help-seeking behaviors. Interviews with two healthcare practitioners informed content and design decisions for the high-fidelity prototype tested by three patients. Analysis of patient pre- and post-survey results provided content and usability feedback and measured the tool’s initial efficacy. This study collaborated with experts from the Women’s Mental Health Research Program in the Department of Neuropsychiatry at the University of Illinois at Chicago’s (UIC) College of Medicine.

18. Aniciete, Jonathan; Jones, Tayler and Bottoms, Bette

**How Fear of False Accusation Affects Jurors: Masculinity and the Offender Stereotype**

*Undergraduate - Psychology*

Extralegal factors such as juror gender often influence jurors' decisions in child sexual abuse (CSA) trials because there is rarely physical evidence. Prior research found that women jurors make more pro-victim decisions than men in CSA cases due to gender differences in case-relevant attitudes and empathy for child victims. Another type of attitude that might be related to jurors' reactions to child sexual abuse cases, and that might help explain gender differences, is the degree of fear an individual has of being falsely accused of child abuse. Because men are typically the defendants in CSA cases and are strongly associated with the "perpetrator" role, I predicted that they would report higher levels of fear of false accusation than would women. I assisted in developing the Fear of False Accusation (FOFA) scale to measure quantitatively one's fear of being falsely accused of CSA. 964 undergraduate (68% women), participants completed a 20-item FOFA scale during a general mass testing session. Scale reliability analyses resulted in the scaling down of the 20-item scale to a 19-item revised scale and a 10-item short-form scale. As predicted, men scored significantly higher (M= 3.20, SD= .84) on the revised FOFA scale than did women (M= 2.85, SD= .75), t(950)= 6.53, p=. 01, confirming the presence of gender
effects in individuals' fears of false accusation in line with my hypothesis. The results provide context to juror's attitudes, perceptions, and biases in CSA cases. For instance, men may not make as many pro-victim decisions as women because of a higher fear of false accusation, something that future research might address.

19. Antic, Jelena; Wick, Sheila M.; Patel, Shital and Mahady, Gail B.

**Blackcurrant (Ribes nigrum) Reduces Myoblast Apoptosis and Enhances Muscle Cell Growth**

*Undergraduate - Honors College*

Blackcurrants (Ribes nigrum) are native to Central and Eastern Europe and Northern Asia, and the berries are used traditionally for the treatment of ailments such as viral infections and inflammation. The berries also have other health benefits including reduced risk of cardiovascular disease and suppression of obesity and diabetes. Blackcurrants contain four major anthocyanins: delphinidin-3-O-glucoside, delphinidin-3-O-rutinoside, cyanidin-3-O-glucoside, cyanidin-3-O-rutinoside. More recently, blackcurrant extracts have been reported to enhance muscle growth and reduce muscle recovery after exercise. In this work we have tested the effects of blackcurrant extracts and pure anthocyanin compounds on myoblast cell proliferation and apoptosis in L6-rat myoblasts. In L6 cells, ethanol extracts of R. nigrum fruit increased the proliferation of rat L-6 myoblasts by 300%. In L6 cells, the extract prevented cellular apoptosis induced by serum starvation. In glucose and serum starved L6 cells, the extracts also prevented myoblast apoptosis. Of the anthocyanins present in the extract, cyanidin-3-glucoside (C3G) was the most active and enhanced L6 growth by 200%, and reduced apoptosis as well. Gene expression analysis showed a dramatic increase in the anti-apoptotic Bcl-2 mRNA expression by > 284 fold, as well as enhanced expression of PPARγ by 4 fold. Both BCE and C3G reduced apoptosis by altering the Bax/Bcl-2 ratio in favor of cell proliferation. These data suggest that fruit extracts and purified compounds reduce muscle cell apoptosis and may be useful for development as a preventative treatment for sarcopenia and muscular dystrophy.

20. Arianas, Demetra and Vajaranant, Thasarat

**Structural and Functional Assessment in Glaucoma Patients: Correlation Between Visual Function and Driving**

*Undergraduate - Ophthalmology & Visual Sciences*

This study will describe results of research conducted on glaucoma patients from the University of Illinois (UIC) Glaucoma Service. Despite having normal visual acuity, patients with glaucoma have limited contrast sensitivity and visual field that negatively impacts daily life activities, such as driving. In this study we aim to assess how glaucoma affects driving and will investigate correlations between visual function and driving. 77 subjects with glaucoma were recruited from the Glaucoma Service at UIC. Subjects underwent a routine eye exam, glaucoma screening test,
and measurements of length and curvature of eye. From these exams, a linear AUC value was compiled, which is a combined index for visual acuity and contrast sensitivity. A survey was administered after to assess driving ability and from the survey, a driving score was calculated. Results showed a strong, positive correlation between linear AUC and sex ($r=0.69$), driving score and race ($r=0.76$), driving score and sex ($r=0.73$), and driving score and linear AUC ($r=0.79$). A very strong, positive correlation was found between linear AUC and race ($r=0.82$).


Salt Inducible Kinase is a Negative Regulator of Granulosa Cell Differentiation in Humans and Rodents

Graduate / Professional - Biophysics and Physiology, Gynecology & Obstetrics

The differentiation of the ovarian granulosa cells (GCs) is a critical step of folliculogenesis required for oocyte maturation and for the formation of preovulatory follicles. GC differentiation is driven by Follicle Stimulating Hormone (FSH) in close interaction with the Insulin-like Growth Factor (IGF) system. In fact, we have shown that FSH fails to stimulate GC differentiation in the absence of IGF1 receptor (IGF1R). This is evident in GC-specific IGF1R knockout mice, which are infertile and fail to express differentiation markers such as aromatase even after the administration of gonadotropins. We previously established that the FSH and IGF pathways converge on the activation of AKT. However, the downstream effects of AKT are still unknown. Considering that FSH actions in GCs are mainly mediated by the activation of cAMP Response Element Binding protein (CREB), this report tested the hypothesis that AKT contributes to the activation of the GC differentiation program by inhibiting Salt Inducible Kinase (SIK), a known negative regulator of CREB. Using human and mouse primary GCs, we observed that treatment with two SIK specific inhibitors increases aromatase and steroidogenic acute regulator (StAR) expression. In addition, inhibition of SIK activity potentiated the stimulatory effect of FSH on StAR, cholesterol side chain cleavage (P450scc), and aromatase expression. We also observed that inhibition of SIK in the presence of an IGF1R inhibitor partially rescued the expression of aromatase. SIK is known to phosphorylate and thus inhibit CREB-regulated transcription coactivator (CRTC2). Next, we examined the effect of FSH on CRTC2 subcellular localization in undifferentiated GCs. The results demonstrated that FSH treatment stimulates the translocation of CRTC2 from the cytoplasm to the nucleus of GCs. Since dephosphorylation of CRTC2 is required for nuclear translocation, we investigated the role of calcineurin, a well-known CRTC2 phosphatase. Inhibition of calcineurin attenuated the stimulation of aromatase expression by FSH in a dose-dependent manner, suggesting that both calcineurin and SIK are involved in the regulation of aromatase expression in GCs. These findings demonstrate for the first time the involvement of SIK in the regulation of GC differentiation in humans and mice. These results contribute to our understanding of the interactions between FSH and IGFs in the control of ovarian function and female fertility.
22. Ayala, Gelique

**Ultrastructural Consequences of Alzheimer's Pathology in White Matter**

*Undergraduate - Neurological Sciences*

Alzheimer’s disease (AD) has traditionally been thought of as a disease of the gray matter, which is composed of the cell bodies and dendrites of neurons. However, recent studies suggest that AD patients also have disrupted white matter (WM), which is comprised of axons and oligodendrocytes that provide myelin to insulate axons. Amyloid beta (AB), the major component of neuritic plaques in AD, exhibits toxic effects on oligodendrocytes in vitro. Specifically, mature oligodendrocytes show significantly increased rates of cell death when treated with AB oligomers, which is worsened by mutations in common familial AD genes. However, AB does not appear to enhance the death of oligodendrocyte progenitor cells (OPCs), but inhibits their ability to form myelin sheets. Therefore, the characteristic AB pathology of AD may drive WM damage through oligodendrocyte cell death and perpetuate damage via the inhibition of re-myelination by maturing OPCs. If a similar process occurs in vivo, it would provide a novel approach in understanding how cognitive deficits manifest in AD. Therefore, I have used electron microscopy (EM) to test the hypothesis that AD mouse models of aging will have significantly less layers of myelin and have a higher occurrence of abnormalities compared to wild-type mice. Additionally, I have used the same methods to examine WM changes in post-mortem tissue from human AD patients relative to non-cognitively impaired healthy controls. Our analysis has shown that in both AD patients and AD mouse models of aging, there are substantially more abnormalities than in their healthy, age-matched counterparts. Such findings indicate that WM damage may serve as a viable target for the treatment of AD, through both new drugs and those that exist for WM-specific diseases, such as multiple sclerosis.

23. Baca Milla, Ana and Raney, Gary E.

**Spanish Speaking Bilinguals Rate Metaphors as More Familiar than Non-Bilinguals**

*Undergraduate - Psychology*

Campbell and Raney (2016) demonstrated that non-native English speaking bilinguals rate low familiar metaphors, such as A fisherman is a spider, as being more familiar than do native English speakers. They proposed this reflects the greater linguistic variability experienced by bilinguals, which allows them to more easily envision relationships between words than non-bilinguals. They did not, however, examine specific language backgrounds. We extended Campbell and Raney’s study by examining individuals who speak only English (English non-bilinguals), native English speakers who learned Spanish (English-Spanish bilinguals), and native Spanish speakers who learned English (Spanish-English bilinguals). Our hypothesis is that Spanish-English bilinguals will rate metaphors of low- and mid-familiarity metaphors as being more familiar than English-Spanish bilinguals and English speaking non-bilinguals. 102
participants rated the familiarity and indicated the number of interpretations they could think of for 60 metaphors that were previously determined to be of low-, mid-, or high-familiarity in English. Results were analyzed using ANOVAs. As expected, for the low- and mid-familiarity metaphors, familiarity ratings were significantly larger for Spanish-English bilinguals than for English-Spanish bilinguals, which were larger than for English non-bilinguals. There were no differences in ratings between language groups for the high-familiarity metaphors. For the Number of Interpretations, there were no differences between the language groups, indicating bilinguals and non-bilinguals could think of the same number of interpretations. Our findings indicate that Spanish-English bilinguals rate less familiar metaphors as being more familiar than English-Spanish bilinguals, who rate the metaphors as more familiar than English speaking non-bilinguals. This is consistent with the conclusion that as diversity of linguistic increases, the ability to perceive relationships between words increases, which leads to increased familiarity ratings for relatively unfamiliar metaphors.

24. Baeza, Cristian

**Strengthening The Education Pipeline Through Support Services: Lares Alumnae Perspectives**

*Undergraduate - Human Development & Learning*

The University of Illinois at Chicago’s Latin American Recruitment and Education Services (LARES) program was founded in 1975 to address the educational needs of the Latino community, assist in the recruitment of Latino students, and provide academic support to fuel Latino retention and graduation rates. To fulfill its objective, LARES promotes holistic advising, in addition to providing a number of services including tutoring, Academic Skills Proficiency courses, workshops, leadership development seminars, and career networking. As noted by the literature, academic support programs are beneficial because they increase academic motivation among Latino students (Olive, 2008) and facilitate social adjustment to higher education (Cerezo, 2012). To assess LARES’ impact Latino students’ retention and graduation rates, this study turned to in-depth interviews with twelve Latino UIC alumnae (half the sample was male, half female). Most of the Latino graduates who took advantage of LARES’ services did so because they felt connected to the staff; they felt as though the holistic advising approach allowed them to have a greater say in the decision-making process; the program offered an environment that generated a sense of comfortability; and, it was one of the few places on campus which exposed students to the Latino culture and political issues important to community. Not only did LARES have a direct impact on the lives of these alumnae as they worked to complete their undergraduates degrees, but the program also had an impact on the job prospects of many of these graduates who took advantage of the networks they had established through LARES to successfully enter the workforce. The one area that LARES needs to strengthen deals with their lack of alumnae networks. Alumnae noted a strong desire to mentor undergraduates, provide shadowing in the workforce, and take greater part in LARES events; however, they felt disconnected once they graduated from UIC. Several alumnae also noted that
the emphasis of LARES tended to be undergraduate services, while opportunities and services for graduate students were limited.

25. Baggio, Emily

**Sentence Diagramming and the Cultivation of Student Voice**

*Undergraduate - English*

While some believe the study of grammar to stifle students’ ability to develop authentic voice, this project proposes the use of Reed-Kellogg sentence diagramming, a quintessential exercise in grammar, as a means to enrich students’ discovery and development of voice. To examine this, the project configures the use of sentence diagramming within a synthesis of two opposing models of composition instruction, current-traditional rhetoric and process writing. Current-traditional rhetoric aims to teach students to properly employ stylistic standards and conventions in their writing. The process writing approach, by contrast -- a reaction against the prescriptive nature of the current-traditional rhetoric approach -- emphasizes having students develop their own stylistic tendencies without fitting them to existing conventions or “rules” of style. While the process approach has been widely adopted by language arts educators over the past several decades, it has also been challenged on the grounds that it fails to teach students the basic skills of writing such as grammar usage (Tobin 2001). This project proposes a synthesis of the two models, where sentence diagramming can be used as a means to teach students to better control and understand their voice through the study of the structural elements of the sentence. In this project, I examine the differences and similarities of the two models in order to explain how I arrived at the synthesis of the two models. Selected sentence diagrams will be used to demonstrate the unique method of analysis that sentence diagramming can offer which enables students to visualize the hallmarks of their individual voice.

26. Baligod, Seth

**PTEN loss in fallopian tube induces ovarian tumorigenesis through WNT4 and LOXL2 pathways**

*Undergraduate - Biological Sciences*

High-grade serous ovarian cancer (HGSC) is the most common and lethal type of epithelial ovarian cancer and is the 5th leading cause of death in women. It is now clear that HGSC originates from fallopian tube epithelium (FTE), and therefore it is critical to study its development from the correct source of origin. Our lab has shown that loss of PTEN alone in FTE cells is sufficient for ovarian colonization and tumorigenesis. Loss of PTEN results in an increase of WNT4 signaling, which is a key player in FTE development. Herein, we have defined the role of WNT4 in ovarian cancer genesis from FTE. Specifically, we developed a
novel ex vivo method using mice ovaries and GFP-labeled PTEN-depleted FTE cells to show that WNT4 mediates colonization of the ovary induced by loss of PTEN. In addition, interactions with the extracellular matrix (ECM) is pivotal to migration and invasion, therefore, we further investigated how loss of PTEN regulates genes involved in ECM function. We have found that LOXL2 is one of the most upregulated genes upon loss of PTEN. LOXL2 is critical for mediating adhesion and migration through focal adhesion kinase and extracellular matrix-related proteins. We show that LOXL2 mRNA and protein expression increase upon loss of PTEN, leading to increased adhesion to extracellular matrix components, more specifically fibronectin and focal adhesion kinase function. This study demonstrates for the first time a correlation between the loss of PTEN and an upregulation of LOXL2. Both WNT4 and LOXL2 signaling mediating the loss of PTEN-driven tumorigenic properties leading to the onset of ovarian cancer from the fallopian tube cells are highly significant in ovarian cancer research, in particular, and in cancer biology in general. As such, our research may provide novel insights for improving early diagnosis and treatment of the disease.

27. Balinski, Nicole and Lardizabal, Jessica

Trypanophobia: Calling the Shots on Preschool-aged Bibliotherapy

_Undergraduate - Nursing_

Entering a doctor’s office or the hospital can be a particularly traumatizing experience for young children. In particular, kids around the age of 4-6 years who are just entering the school setting are particularly susceptible to having a tense experience. Stressors that this population face are separation anxiety, unfamiliar environment/routine and the fear of pain, mutilation, and castration. When first going into kindergarten most states mandate that the children are to receive multiple vaccinations such as DTaP, IPV, MMR, and Varicella. For most children shots and intrusive procedures are traumatic experience and they will most often resist it. Incorporating Bibliotherapy while caring for the pediatric population will help to ease their anxiety. Providing Bibliotherapy using fictional characters to give a clear explanation of what the child will expect it will hopefully help to reduce their anxiety about the procedure. Clear explanations given in the story present them a chance to ask any questions during the process and will help them to feel empowered and an active participant in their care. Utilizing Bibliotherapy into clinical practice will help to alleviate some stressors this particular population faces and make their experience overall more pleasurable, and hopefully foster compliance in future needle experiences.

28. Baltrimaviciute, Auguste

 Individuals and the Soviet State: Analyzing Letters from a Lithuanian Soldier in the Soviet Army

_Undergraduate - History_
For this paper, I am examining how the idea of nationality and independence became paramount in Soviet Lithuania in the late 1980’s. Furthermore, how is that reflected in the letters written by a Lithuanian soldier compulsorily serving in the Soviet Army between 1988 and 1989? These research questions are guiding me toward understanding what the social climate was like before independence, which was declared by Lithuania in 1990. The way that ordinary people (rank-and-file soldiers) saw the Soviet Union and themselves within it is providing me with a different perspective than I would have if I only looked at the function of the Lithuanian state within the Soviet Union. In this way, I will also be looking at identity and how soldiers saw themselves in relation to the nation building project and the formation of a uniform national identity. I am analyzing a previously untapped source of handwritten correspondence between a Lithuanian soldier and his family back home. The 22 letters written between 1988 and 1989 are providing me with qualitative data that I will use to explain the relationship between this young individual and the state. Most scholars have taken a much broader approach to studying the fall of the Soviet Union that loses sight of the individuals involved in this complex process. By analyzing the experiences of a single man and placing it in a larger socioeconomic and political context, I will be able to evaluate how individuals both shaped and reacted to historical trends like perestroika and Lithuanian nationalism, as opposed to just analyzing those concepts by themselves.

29. Ban, Courtney

An Examination of Cooking Habits and Barriers to Cooking in Barcelona and Chicago

Undergraduate - Kinesiology and Nutrition

It is undeniable that time spent on home cooking in the US has declined over the last 50 years, contributing to the persistent obesity epidemic plaguing modern life. The expansion of convenience food intake has significant implications for future generations, both in health and cultural aspects (Smith et al., 2013). The purpose of the study is to examine barriers and motivators to home cooking amongst different cultures. This mixed-methods study surveyed and interviewed individuals in Barcelona and Chicago to examine the diverse factors impacting cooking behavior. Comparisons of study group responses (UIC Foods vs Study Abroad, UIC Staff vs CEA Staff) were made based on average respondent age for each group. Statistically significant findings between the UIC Foods and Study Abroad groups include: frequency of cooking from scratch \( p = 2.1 \times 10^{-5} \), frequency of cooking with others \( p = 0.0065 \), perceived knowledge of food and nutrition \( p = 0.047 \), and perceived food preparation skills \( p = 0.046 \). Emergent themes included: generational learning, food agency, time scarcity, and intrinsic motivation for cooking behavior. In consideration of the Self-Determination Theory, the study recommends further research into interventions that account for cultural variation in intrinsic motivation to facilitate home cooking.
30. Baniewicz, Raymond

**Idealism and Its Implications**

*Undergraduate - Mathematics, Statistics, and Computer Science*

Many problems that have plagued the individual across generations may be said to have the same causation. Our ideals change over time, but they are constant in their ability to draw the majority into a quest for that which cannot be acquired. Most-pressing are issues that stem from our chasing of ideals at the expense of those without the means to chase them in the first place. Less-menacing, though harmful in every sense still, are ideals that perpetuate individual feelings of failure or inferiority. Regardless, movement away from idealistic thought allows for modern society's realistic analysis of the issues of the day, the likes of which can lead to positive and effective change. Tracy Letts' August: Osage County, Henrik Ibsen's The Wild Duck and George Bernard Shaw's The Quintessence of Ibsenism are utilized in an effort to highlight the presence of idealism in society and its implications.

31. Baranauskaite, Justina and Maniscalco James

**Hindbrain prolactin-releasing peptide (PrRP) neurons: responses to visceral illness and modulation by short-term fasting**

*Undergraduate - Neuroscience*

PrRP neurons of the hindbrain nucleus tractus solitarius (NTS) receive robust sensory information and contribute to neural, hormonal, and behavioral stress responses. Interestingly, PrRP processing of sensory and stressor information appears to be dependent on metabolic state, as overnight fasting reduces stressor-induced PrRP neural activation. Although PrRP neurons are activated by numerous stressful stimuli, it is unclear whether they are recruited by lithium chloride (LiCl). LiCl is a nauseogenic agent that produces visceral illness, stress responses, and conditioned taste aversion (CTA), a learning phenomenon in which the pairing of a novel taste with illness results in subsequent aversion to that taste. NTS neural signaling is critical for LiCl-mediated CTA, however, it is unknown whether PrRP neurons are involved. Considering this, we hypothesized that 1) LiCl would activate PrRP neurons in fed but not fasted rats, 2) exposure to a taste previously paired with LiCl would activate PrRP neurons, and 3) fasting prior to LiCl-taste pairing would reduce activation of PrRP neurons following subsequent taste exposure. To test (1), fed or fasted rats were perfused after LiCl or NaCl injections, and brain sections were processed for cFos – a marker of neural activity – and PrRP immunolabeling. To test (2) and (3), rats with intraoral cannulas were infused with saccharin, following by LiCl or NaCl. One week later, rats were re-exposed to oral saccharin, perfused, and brain sections processed for cFos and PrRP. Our results indicate that fasting reduces LiCl-induced activation of PrRP neurons. Moreover, preliminary results suggest that fasting prior to LiCl-saccharin pairing reduces the ability of subsequent saccharin exposure to activate NTS PrRP neurons. Together, these results suggest that PrRP neurons may be involved in coordinating stress and learning responses to visceral illness in a manner that is dependent on food intake and metabolic status.
32. Barmada, Anis and Shippy, Scott

**Analysis of Arginine Metabolism in Tears at the Diabetic Cornea by Capillary Electrophoresis**

*Undergraduate - Biological Sciences*

Seventy percent of diabetic patients suffer from complications in the cornea. These complications ultimately lead to corneal opacities, which rank as the second most frequent cause of blindness. Since early detection is crucial in the treatment of diabetic eye disease, we aim to develop a non-invasive biomarker for clinical applications in early diagnosis and monitoring of diabetic eye disease pathogenesis. The pathophysiological mechanisms in diabetic eye disease were associated with significant changes in arginine metabolism in tears. Here, we establish a non-invasive method to analyze arginine and arginine metabolites in tears. The method involves processing tears on phenol red thread and quantifying the amino acid content using capillary electrophoresis. The established method was successfully tested to analyze arginine metabolism in human basal tears. The proposed hypothesis will be tested on the hyperglycemic db/db mouse model of type 2 diabetes using the established method. This study will lay the foundation for a novel and clinically significant therapeutic approach for the treatment of diabetic eye disease.

33. Bashir, M.M.

**CPS DIVERSITY ANALYSIS: the affects of Income, Diversity, & Green Infrastructure on School Quality & Outcome Indicators.**

*Graduate / Professional - MESA*

Chicago Public Schools (CPS) are often called one of the most segregated education systems in America. In order to measure Chicago demographics, 2013-14 datasets were analyzed using an Hierarchical Linear Model (HLM) to observe the variances between several neighborhood and school performance indicators. For calculating ethnic heterogeneity, ie student population diversity within high schools, I used a Gini-like coefficient to aggregate published percentages for CPS statistics. My partner and I, compiled statistics for ACT and PLAN test scores, graduation rates, misconduct, bilingualism, special education, and free lunch for LEVEL-1 analysis. Median neighborhood income was a LEVEL-2 variable that grouped all of the 90 schools by zipcode. Our HLM presentation was as startling as the 2017 UIC study titled, “A Tale of Three Cities.” For every $1000 dollars of median income increase / zipcode, schools significantly showed a 1-point increase in PLAN test scores. Gini quintiles divided ethnic diversity into five groups, from 0-20% as being predominantly one ethnic group, to high percentages reflecting greater diversity values. PLAN test scores increased by 3-points with every unit increase in diversity. Significantly, greater student diversity in Chicago predicted higher test scores. An important question raised by our peers was ‘confounding predominantly White, higher-performing schools with lower performing Black or Latino schools – where the Gini % value looks equal but represents three different groups (and therefore neighborhoods). I parse this data, and reanalyze our model with other output measures. Finally, using public parks,
I wondered if “Green Infrastructure” had any effect on test scores or school quality. Using Geographic Information Systems (GIS) to extract this data with respect to CPS, more robust HLM models are developed and presented today.

34. Beltran, Diana

**Visuals in Biology Education: A Reflection on the Relationship Between Visuals and Student Learning.**

*Undergraduate - Psychology*

Visual learning is well known as a valid and effective approach to education, yet the visuals in STEM programs are not always effective in the classroom due to an inability to be used by educators or to be understood by students. In biology education visuals may need to convey anything from the structure of a DNA helix, the internal build of an organism, or the fluctuation of an ecosystem. All of which are at the mercy of artists since photography would be highly limited in these cases. DNA helices are often depicted as left hand helices, while 3D organ systems are oversimplified for 2D depictions, and illustrated timelines become futile when unit integrity is ignored. The visual tools meant to aid in the classroom hinder the message of educators and misleads student learning because of a fault in consistency, clarity, creativity and/or accuracy. In this review, visual learning methods and their importance will be the focus accompanied by examples made for an embryology curriculum.

35. Bhatt, Kruti and Clark, Ginevra

**Implementing Social Justice in a TLC Lab**

*Undergraduate - Chemistry*

This lab was designed to teach students methods to detect Neonatal Respiratory Distress Syndrome (NRDS) and the role of lung surfactant. Students used thin layer chromatography in order to detect NRDS. Although ninety-nine percent of NRDS deaths happen in low-resource countries, most of the research is done on the one percent of high resource countries. Looking at this lab from a different perspective that has to do with low resource settings can be beneficial for the pre nursing students for the future. Student’s will be told to watch a video related to an organization on campus, and will expose them to community service. This is meant to encourage students to go beyond a classroom setting. In order to analyze results, we viewed artifacts from the lab and compared them to our framework of cultural competence.

36. Biyashev, Ismael

**A Study in Contradictions?: Alexander Adrianov's 1881 Tuvian Expedition**

*Graduate / Professional - History*
The present project is part of my ongoing dissertation project, a study of the archaeology of nomadic societies in the late 19th century Russian Empire. The project seeks to illustrate and explain how nomadic civilizations were understood and conceptualized in the late imperial period in Russia, in reference to both their contemporary historical development and the deployment of nomadism as a narrative for the empire's 'usable past'.

37. Bozeman III, Joe and Theis, Thomas

Global Food-Energy-Water (FEW) Impacts as they relate to U.S. Dietary Choice

Graduate / Professional - Civil and Materials Engineering

The U.S. food system was estimated to use 50% of total U.S. land, 80% of fresh water resources, and 17% of its fossil energy (Pimentel et al., 2003). Studies show that dietary choice impacts human health and affects the physical environment (Ahola et al., 2016; Heller et al., 2003). As it relates to proper nutritional and caloric intake, U.S. residents generally overconsume foods like poultry, meat, and eggs, and underconsume fruits and vegetables (Heller et al., 2014). Furthermore, about 49.1 million U.S. households lack access to healthy food alternatives like the fruits and vegetables Americans generally underconsume (Coleman-Jensen et al., 2014). These food, energy, and water (FEW) impacts are likely to intensify with increased population growth and consumption demands (Schneider et al., 2011; Tilman et al., 2002). Despite these findings, there is a lack of current literature that deeply investigates how FEW impacts relate to U.S. dietary choice. Using updated data from the U.S. Department of Agriculture (USDA), the Food and Agriculture Organization, the Double Food-Environmental Pyramid Model, and current literature on food-item FEW impacts, we estimated FEW impacts for all basic food items. When considering current U.S. dietary intake patterns (FCID, 2018), our research suggests that Americans require at least 65 trillion liters of fresh water and 195 billion square meters of land per year to maintain its food consumption patterns. Also, the U.S. was estimated to yield over 94.9 billion kilograms of carbon dioxide equivalent per year. These findings suggest that action is needed to preserve vital natural resources and environmental integrity. We believe feasible solutions include decreasing the amount of U.S. imported foods (USDA, 2016), increasing the amount of locally-grown foods through improved urban and peri-urban agricultural activities (Smit & Nasr, 1992), and reducing the obstacles that inhibit urban and peri-urban agricultural success (Castillo et al., 2013).

38. Breckling, Abbey; Jones, Michael and Ferrigno, Chris

Iliocapsularis and Long Head of Triceps Brachii Innervation: Not Such "Textbook" Cases

Graduate / Professional - Kinesiology and Nutrition

Anatomy instructors rely on accurate anatomical texts to facilitate instruction. While the understanding of anatomy continues to evolve, recent advancements are most reliably reflected in the vast amount of peer-reviewed literature (PRL). Adjustments in anatomy textbooks (TBs),
however, may take years to occur due to the publishing constraints such as illustrations and content vetting procedures. Consequently, TBs tend to lag behind the PRL with respect to new content. Subsequently, anatomy instruction may be dated despite the well-intentioned instructor. Here we highlight two musculoskeletal-focused discrepancies in anatomical PRL and TB literature: the presence of the Iliocapsularis (IC) and the innervation of the Long Head of Triceps Brachii (LHTB). To explore potential discrepancies, we used convenience sampling and audited 16 widely-used TBs published within the past 10 years (3.1 ± 2.8 years) to determine the presence of IC and the innervation of the LHTB. We also analyzed PRL published within the past 18 years (5.4 ± 6.7 years) which focused on studies that used MRI or dissection to determine the presence of IC, and dissection only to explore the innervation of LHTB to the triceps. We conducted human dissection to verify the literature audit findings. To better evaluate the presence of IC, we dissected 22 anterior hips on preserved limbs in 11 cadavers and 5 unpreserved limbs in 3 cadavers. To better assess the innervation of the LHTB, we dissected the posterior shoulder and arm on 5 preserved limbs in 5 cadavers and 3 unpreserved limbs in 3 cadavers, with the aim of completing LHTB dissections on a minimum of 20 limbs. Out of 16 TBs reviewed, only 1 suggested the presence of IC and all reported the radial nerve as the innervation of LHTB (Table 1). Conversely, 4 PRL studies used dissection or MRI to assess the presence of IC and 3 studies used dissection to assess the innervation of LHTB by nerves other than the radial nerve (namely the axillary nerve) (Table 2). When pooling the individuals assessed in PRL, 100% were found to have an IC (n=271) and 72.2% were found to have a LHTB innervated by the axillary nerve. Our dissections of the anterior hips revealed that the IC was present in 100% of the 27 limbs. Our dissections of the posterior shoulder and arm revealed that the axillary nerve innervated the LHTB in 50% of the 8 bodies, including 2 of the 5 preserved limbs and 2 of the 3 unpreserved limbs. This study demonstrates that recently published TBs are not in alignment with the anatomical findings of our dissections or, more importantly, with the PRL. These findings suggest that anatomist instructors, as well as clinicians, should be familiar with recently published PRL and not rely solely on anatomical TBs.

39. Buchert, Martha

Cranial Modification at Ancon, Peru

Undergraduate - Anthropology

Many cranial modification studies analyse Middle Horizon or Late Intermediate Period Peruvian cultures and their usage of head shape as a group marker. To understand the range of this practice, this research endeavours to comprehend how cranial modification marks social belonging in the Ancon culture located on the coast north of Lima. Using Lozada’s (1996) typology with references to Buiskstra and Ubelaker (1994), I analysed forty skulls from the Field Museum’s Ancon skeletal collection for cranial modification and estimated sex and age. Statistical analysis reveals 67% of the forty individuals display cranial modification with 46% being fronto-occipital type and 54% being annular. Conditional distribution and chi-square tests
display no significant differences in modification or type frequencies between different sexes or age groups. The high frequency of cranial modification indicates the Ancon culture perceived the shaping as a relevant cultural symbol, but more investigation is required to understand its meaning.

40. Calero, Angelo and Coba-Rodriguez, Sarai, CFLE, Ph.D.

“I am putting that idea in her head”: Mother-Child Communication About the Kindergarten Transition

*Undergraduate - Psychology*

The transition to kindergarten is a critical milestone in children’s lives, with long-term implications for academic success. Children growing up in families from low-income, Latino background are at heightened risk for negative academic, cognitive, and social outcomes as they transition to kindergarten, more so than their White and Black counterparts. However, researchers document that Latino children demonstrate greater levels of academic success when parents are active in their education. Yet, some research on Latino families report that they are uninvolved in their children’s education. Little research exists on the kindergarten transition of this population, and how families positively support their children’s kindergarten adjustment. Contributing to this gap in the literature, we utilized qualitative interviews informed by resilience theory to explore how 17 low-income, Latina mothers facilitated their Head Start preschooler’s transition to kindergarten. Preliminary findings suggest that despite possessing parental/family demographic risk factors, mothers monitored and assessed their children’s development through one-on-one conversations with preschoolers. Adding further to the limited existing research, we offer a detailed account of the messages mothers provided to children, and how preschoolers responded. Findings provided recommendations for effective home-school collaborations.

41. Canilao, Michael Armand

Gold Trade Networks in Northwestern Luzon Early Historical to Historical period (10th to Early 20th c)

*Graduate / Professional - Anthropology*

The dissertation is multifaceted using a triangulation of sources and methods including ethnohistory (written and oral tradition), archaeology, and geographic information systems (GIS) and high resolution and multispectral satellite remote sensing data towards understanding Northwestern Luzon Island gold trading pathways and schedules from the Early Historical to Historical Period (10th to Early 20th c). The dissertation data from Northwestern Luzon may be of great potential in the reconstruction of regional diachronic (dynamic) processes. The regional data assembled through this project shows marked variation in the adaptive strategies used by coastal and interior communities in this area as they articulated with the expansive Indian Ocean-South China Sea (IO-SCS) gold-for-export ceramics maritime trade system from the 10th to the
early 16th c, as well as how they adapted and reconfigured their interrelationships as they navigated Western contact from the mid-16th c to the early 20th c. While some nodes (interior communities) evolved full connectivity (dependence) to the overseas system acting as cogs in the bulk movement of products (again notably gold) to the more ‘permanent market’ locations in the coast, some may have been more weakly connected and participated in ‘evanescent market’ encounters on the coast.

42. Cantoral, Jackelyn; Marques, Isabela and Marquez, David

Using a Physical Activity Wearable Tracker: Older Latinos’ Perceptions

Undergraduate - Kinesiology and Nutrition

By 2050, more than 21 million older Latinos are expected in the U.S. The Latino population has been gaining access to technologies, which could aid adherence to PA, yet they have low levels of leisure-time physical activity (LTPA). The purpose of this study was to identify older Latinos’ perceptions of tracking their PA during an intervention. Participants were enrolled in the 16-week BAILA TECH program that includes the BAILAMOS© dance program, the use of a wearable PA tracker and associated mobile application, text messages, and mobile technology education classes. Participants were asked to wear a wearable for 19 weeks. Classes were held twice a week for 2 hours each session. Focus groups were held at the beginning of each month of the program. Discussions were recorded, transcribed in Spanish, translated into English, and thematic analysis was conducted. Discussion 01 was held after 2 weeks of wearing the PA tracker, and participants reported concerns with overall use, such as the hazards of charging it overnight, getting the wearable wet or it being too tight. Discussion 02 was held 6 weeks of wearing the PA tracker, and participants had more specific questions about the PA tracker (e.g. how to track water consumption, why the wearable vibrates). Discussion 03 was held 10 weeks of wearing the PA tracker, and participants reported exploring various features on the device (such as sending friend requests). Discussion 04 was held 14 weeks of wearing the PA tracker, and participants reported the wearable as motivating them to finish their daily goal steps, most of them would look at their step count at the end of the day and finish the remaining steps needed to complete their goal. Future interventions should incorporate mHealth educational classes to increase engagement with mobile technology.

43. Carrillo, Elena; Yan, Jiajie and Ai, Xun

Time-Dependent JNK Activation Due to Chronic Stress

Undergraduate - Biological Sciences

The c-Jun N-terminal Kinase (JNK) is activated in response to various stress stimuli such as ribotoxic and osmotic stress. JNK has been implicated in the pathogenesis of diseases including Ischemic Stroke, Parkinson’s Disease, Diabetes, and atrial fibrillation, the most common cardiac arrhythmia. The Ai lab has recently discovered, for the first time, a causative role of activated
JNK in atrial fibrillation development. Connexin 43 (Cx43) is a highly expressed channel protein in cardiac tissue involved in cell-to-cell communication. Recently, we had discovered that JNK plays a critical role in Cx43 expression in chronic stress models such as aging and heart failure, and the JNK-induced Cx43 downregulation impairs cell-to-cell communication between myocytes, which ultimately facilitates the onset of arrhythmias and heart failure. It is well known that JNK is quickly activated in response to the stress challenge, however, whether or not JNK is activated in a dynamic pattern over time in response to a longer period of stress challenge remains unclear. Here we measured dynamic changes of JNK activities in cultured live cells using a unique fluorescent resonance energy transfer (FRET) based JNK biosensor. Cultured mammalian HEK293 cells were exposed to anisomycin, a potent JNK activator, over 24 hours at varying concentrations (10, 30, and 50ng/ml). First, we found that JNK activity was increased over time (from 15mins up to 24hrs). Second, this JNK activation was in an anisomycin dose-dependent manner. Finally, we evaluated whether isoform-specific JNK activity is involved using either a JNK specific Inhibitor, SP600125 (no JNK isoform selectivity), or a JNK2 isoform specific Inhibitor. We discovered that anisomycin-induced JNK activity was abolished by SP600125 but only partially inhibited by JNK2 inhibitor. Thus, JNK activation in response to a stress challenge is in dose-dependent, time-dependent, and possible JNK isoform-dependent manners.

44. Castillo, Roberto and Aceves, Eduardo

Understanding the role of TTHERM_00339880, a gene Related to Cyclin-dependent Protein Kinases, in the Ciliate Tetrahymena Thermophila

Undergraduate - Biological Sciences

Cyclin-dependent protein kinases (Cdks), a family of serine/threonine protein kinases, play a role in gene transcription and cell division. The model ciliate Tetrahymena thermophila possesses the gene TTHERM_00339880, known as TtCdk19, which has been identified as a homolog to cyclin-dependent protein kinase, specifically Cdk19. In T. thermophila, this Cdk is only expressed during starvation and at the initiation of conjugation, the sexual reproduction cycle in this ciliate. To study TtCdk19, we amplified the gene with PCR and cloned it into the pENTR/D-TOPO entry vector. We then generated a fusion construct with the pIGF-gtw expression vector, containing the green fluorescent protein, and the cloned TtCdk19 gene. Transformation of the fusion construct into T. thermophila through electroporation was completed, and five transformants were isolated. We are verifying the transformants and will then test the localization of the TtCdk19 fusion protein through immunofluorescence microscopy. We will assay localization focusing on logarithmically growing and starving cells. We anticipate that TtCdk19 will be present within the two nuclei of the ciliate, since both nuclei of the cells must perform transcription to continue the cell cycle. We hope that our analysis of TtCdk19 will give an insight on the mechanisms that allow T. thermophila to initiate mating, and provide a comparison for the function of Cdks in other organisms.
Robotic-Assisted Placement of Hepatic Artery Infusion Pump for Regional Chemotherapy of Colorectal Liver Metastasis with Indocyanine Green Perfusion Test

Graduate / Professional - Surgery

Introduction: Isolated unresectable colorectal liver metastases are treatable with combination therapies such as surgical resection, hepatic artery infusion (HAI) chemotherapy, and systemic chemotherapy. Minimally invasive methods provide an avenue for improvement in patient surgical outcomes. We hypothesized that robotic assisted placement with not only provide a good platform to, not only place the device, but also allow for indocyanine green (ICG) in-vivo confirmation in place of methylene blue (MB). Patient: A 60-year-old male presented in January 2018 with a cecal mass with bilobar unresectable liver metastasis. He underwent primary tumor resection in January, and due to the isolated nature of his systemic disease, the decision was made to treat the patient with neoadjuvant combination chemotherapy to downstage the patient for surgical resection in the future. Technique: The patient was placed supine on the operating room table, and four robotic and two laparoscopic assistant ports were placed. A standard cholecystectomy was performed. The common hepatic artery was identified and used to guide the dissection of lymph node basin, the gastroduodenal artery (GDA) and the right gastric artery. The gastric artery was ligated. The robotic scissors were used to create a transverse GDA arteriotomy, and the HAI pump catheter tip was advanced and secured. An ICG perfusion test was performed to ensure isolated hepatic perfusion. Subsequently, systemic injection of ICG was used to rule out hepatic artery flow obstruction. Estimated blood loss was 20 ml, and the postoperative course was uneventful. On post-operative day 13, simultaneous systemic mFOLFOX and HIA infusion of FUDR were initiated. Discussion: ICG has the advantage of providing superior optical properties at lower a dosage then MB to assess proper hepatic uptake and no extrahepatic perfusion while minimally invasive surgery allows for faster recovery and simultaneous initiation of chemotherapy to possibly bridge a patient to resection.

Extreme Icephobicity of Passive De-Icing Materials

Graduate / Professional - Mechanical and Industrial Engineering

Hesitant at first, hastening post, quiescent for the most, falling snowflakes are infinitely many yet en masse one; a visual treat to cherish. Ironically, the menace of ice-frost formation on functional surfaces is ubiquitous in our daily life, having a deleterious effect on the safety and effective performance of transportation, power generation and transmission, thermal management and telecommunication industries entailing yearly economic damage of billions of dollars worldwide. Over the years, despite remarkable progress in the fields of microfabrication and surface chemistry, majority of the engineered surfaces have been futile in passively curbing icing under extreme environs of freezing temperatures and high humidity; with the modern industry still
relying heavily on active mechanical, chemical and electro-thermal de-icing techniques which are often energy and cost intensive. Motivated by this and conducting research on material characterization, interfacial thermofluidics and surface engineering, we have developed a novel class of durable passive icephobic materials. Having tested these materials in their pure form in a controlled humidity glovebox with 80 percent relative humidity (RH) and freezing temperature of -15°C, significantly delayed ice formation was demonstrated as compared to conventional superhydrophobic surfaces; with some of the materials exhibiting sustained ice free operation for more than 91 hours. Subsequently, the role of the substrate material’s nature, surface topography (roughness), crystalline structure, dependence on environmental conditions which dictate the icing physics have been studied in detail. Additionally, the materials on being infused into micro textured hydrophilic surfaces and tested in a humid atmosphere of 60 percent RH and temperatures of -7°C, were shown to outperform the control superhydrophobic surfaces by 2-4 times and Slippery Liquid-Infused Porous Surfaces by 3-6 times in terms of icing delay. The encouraging ice mitigation results of these novel materials have the potential for the design and fabrication of durable industrial anti-icing coatings.

47. Chatterjee, Tanima; Palmieri, Laura; DasGupta, Bhaskar; Al-Qurashi, Zainab and Sidiropoulos, Anastasios

Alleviating Partisan Gerrymandering: Can Math And Computers Help To Eliminate Wasted Votes?

Graduate / Professional - Computer Science

Partisan gerrymandering consists of redrawing the district boundaries to give electoral advantage to a political party. In 1986, it was declared unconstitutional and justiciable by the US Supreme Court and, since then, many efforts have been done to find a standard that could be adopted by the Court to quantify gerrymandering and eventually reject a redistricting plan. In previous studies, it was concluded that notions such as quantitative measure of shape compactness and other geometric indices had many limitations, as redistricting policies take into account other constraints, and the algorithms that used those indices were highly computationally complex and made the redistricting process unfeasible. Recently, Stephanopoulos and McGhee introduced Efficiency Gap, a new measure of partisan gerrymandering, which is defined as the ratio of the difference between the parties' wasted votes (in a two-party electoral system) to the total number of votes cast in the election. This metric was found legally convincing by a US Appeals Court in a case appealed in 2017. The outcomes of the elections in the last decade showed the most extreme partisan gerrymandering in the American history and it is very important that the US Supreme Courts adopts a standard to quantify gerrymandering and to have more control on the redistricting process. In this research project, we provide a local search algorithm able to "ungerrymander" the 2012 house district maps for Wisconsin, Virginia and Texas by bringing their efficiency gap to acceptable levels. Due to the computational complexity in finding all the possible redistricting plans, we also proved that it is possible to find a district map, efficiently and in polynomial time, that minimizes the efficiency gap. If the US Supreme Court upholds the
decision of lower courts, our work can provide a crucial supporting hand to remove partisan gerrymandering.

48. Chennakesavalu, Mohansrinivas; Mathew, Biji; Sharma, Monica; Stelman, Monica; Tran, Sophie and Roth, Steven

Involvement of Autophagy in Retinal Ischemic Post-Conditioning

Undergraduate - Biological Sciences

Retinal ischemia is a major cause of vision impairment/loss and a common underlying mechanism associated with diseases such as glaucoma, diabetic retinopathy, and central retinal artery occlusion. We have previously demonstrated the robust neuroprotection in retina induced by post-conditioning (post-C), a brief period of ischemia 24 h following prolonged and damaging initial ischemia in rat. The mechanisms underlying the remarkable protection conferred by post-C are largely uncharacterized. Based on ischemic preconditioning studies in the heart and brain, we hypothesized that autophagy plays a key role in mediating the neuroprotection following post-C. Utilizing our in-vivo model of retinal ischemic injury, we observed significant increases in autophagy proteins LC3-II and Beclin-1 and a significant decrease in P62 in the post-C group vs sham post-C group. Similar results in LC3-II, P62, and Beclin-1 were observed in the in-vitro model of retinal ischemia. To further study the involvement of autophagy in post-C, we blocked two key proteins involved in autophagosome formation (Atg5 and Atg7) using small interfering RNA (siRNA). Blockade of Atg5/7 attenuated the protective effect of post-C (measured by electroretinography) and increased histological damage compared to treatment with non-silencing siRNA. Blockade of Atg5 siRNA attenuated post-C induced protection in our in-vitro model as measured by cell proliferation and viability. Post-C induced greater autophagic flux as visualized using tandem RFP-GFP-LC3B in vitro. Finally, we demonstrated that induction of autophagy via TAT-Beclin attenuates cell death in retinal neurons subjected to oxygen-glucose deprivation. Taken as a whole, our results suggest that autophagy is involved in the neuroprotective effect of retinal ischemic post-conditioning and that supplementation of autophagy offers promise in the treatment of retinal ischemic injury.

49. Cho, Sungjoon; Won, Kyoung-Jae; Tripathi, Ashutosh; Leone, Vanessa; Hubert, Nathaniel; Chang, Eugene B; Lee, Hyunwoo and Jeong, Hyunyoung

Differential microbiota in the gut modulates susceptibility to acetaminophen-induced hepatotoxicity in C57BL/6 mice.

Graduate / Professional - Biopharmaceutical Sciences

Drug-induced liver injury (DILI) is the leading cause of acute liver failure in the US. Risk factors for developing DILI remain unclear, and thus identification of the individuals highly susceptible to DILI has been difficult. The objective of this study is to investigate the role of gut microbiota in modulating susceptibility to DILI using an acetaminophen (APAP) as a model drug. C57BL/6
mice from two different vendors [Jackson (JAX) and Taconic (TAC)] were cohoused with mice from the same or the other vendor for 4 weeks. After overnight fasting, mice were dosed with APAP (300 mg/kg, i.p) and sacrificed 24 h after dosing. Hepatotoxicity was determined by measuring serum levels of alanine aminotransferase (ALT). TAC mice showed 4.7-fold higher ALT level compared to JAX mice, and this was abrogated upon cohousing. To further verify the role of differential gut microbiota in APAP hepatotoxicity, cecum materials from JAX or TAC mice were inoculated to C57BL/6 germ-free (GF) mice and APAP toxicity were measured after 4 weeks. Mice given TAC cecum exhibited 2.8-fold higher ALT level than mice that received JAX cecum, recapitulating the toxicity difference in conventional JAX and TAC mice. To identify the underlying mechanisms, a time-course experiment was performed where JAX and TAC mice were sacrificed at 0, 0.5, 2, 6, 12 or 24 h after APAP dosing. TAC mouse liver exhibited faster and prolonged presence of APAP-protein adducts. The extent of glutathione depletion after APAP dosing was greater in TAC mouse liver while the expression of CYP2E1, the major enzyme mediating APAP bioactivation was similar between JAX and TAC mice. Taken together, these results suggest that differential gut microbiota modulates susceptibility to APAP-induced hepatotoxicity potentially by altering APAP-protein adduct formation.

50. Chockalingam, Aishwariya and Madhavan, Sangeetha

**Correlation between the 10-Meter Walk Test and GAITRite in gait speed in stroke population**

*Undergraduate - Kinesiology and Nutrition*

Background: The 10-MWT and GAITRite are common outcome measures to assess gait speed. The 10-MWT assesses gait speed by measuring the time it takes to walk 10 meters and the GAITRite, a pressure sensitive walkway, measures the spatio-temporal parameters to assess gait capacity. Currently, there are no studies evaluating the relationship between gait speeds from 10-MWT and GAITRite in chronic stroke survivors. The purpose of this study is to determine the relationship between the gait speeds obtained from the 10-MWT and GAITRite in chronic stroke survivors. Method: This study is a retrospective data analysis where seventy stroke survivors (48 M, 22 F ages 50-80) performed both the 10-MWT and GAITRite at their self-selected speed (SS) and fast speed (FS) for two trials each. Individuals who used an assistive device performed the tests both with assistance (SSa and FSa) and without assistance (SS and FS). The average gait speed from both trials were computed. Pearson’s correlation coefficient was calculated to determine the association between the two outcomes. Result: The SS showed a weak correlation (R2 = 0.18, p<0.001), FV showed a moderate correlation (R2 = 0.37, p<0.001). Both SSa and FVa showed a good a correlation (R2= 0.744, p<0.001, R2 = 0.81, p<0.001). Conclusion: The results of the study suggest that gait speed measurements for participants walking with assistive devices correlated more between the 10-MWT and GAITRite; however, a low-moderate correlation with no assistance. A possible explanation could be due to a smaller size with assistance because there are less outliers resulting in more linear graph. Future studies can
evaluate the reliability and validity of gait speed obtained from 10-MWT and GAITRite in chronic stroke populations.

Keys Words: 10 MWT GAITRite, Stroke, Gait speed

51. Chu, Alex and Heit, Bradley Stavros

The Expression of xCT on Anoxia Depolarization in Hippocampal Brain Slices

Undergraduate - Psychiatry

Stroke is one of the most common neurological disorders and can lead to death or permanent brain damage. One of the most common type of strokes is the ischemic stroke, where blood clots up in the artery and insufficient oxygen is delivered to the brain. Without the crucial oxygen, neurons in the brain cease to function correctly and may die. When looked more deeply into, the neurons go through an ischemic cascade when insufficient oxygen is provided. This ischemic cascade end with excitotoxic damage to the neurons in play. Glutamate is believed to be one of the key neurotransmitters involved in excitotoxicity. We hypothesize that reducing extracellular glutamate is crucial delaying the excitotoxic effect. To test this hypothesis, we focused on the glutamate/cystine antiporter, xCT or system Xc-. We tested for synaptic and antidromic responses on transverse hippocampal slices. The slices were subjected to anoxia by turning off oxygen flow to the slices. The anoxia depolarization (AD) time was recorded to be used as the speed of the ischemic stroke. We found that xCT knockout mice, xCT-/-, have a higher AD time than wild type mice. The xCT-/-, when subjected to a 10 µM glutamate bath, showed an AD time less than the normal condition. In conclusion, glutamate release by the xCT antiporter is crucial to the onset of ischemic stroke. This finding highlights the importance of channels that involve release of extracellular glutamate to the synapse. Blocking these channels can potentially increase the amount of time given for physician to reverse an ischemic stroke attack.

52. Cisner, Kevin and Friedman, Lee

The Effectiveness of Chicago's Red Light Traffic Enforcement Cameras at Reducing Total Crashes and Injuries at Intersections

Graduate / Professional - Environmental and Occupational Health Sciences

The Illinois Department of Transportation (IDOT) reports that deaths and injuries resulting from traffic accidents are a serious public health concern in the State of Illinois. In 2014, the Illinois Department of Public Health (IDPH) and IDOT reported 296,049 traffic crashes within the State of Illinois. In 2003, the City of Chicago implemented red light traffic enforcement cameras to reduce total crashes and injuries at high accident intersections. This study aims to answer if Chicago's red light traffic enforcement cameras genuinely reduce traffic-related crashes and injuries at intersections. The study uses the 2004-2010 IDOT traffic crash and injury data, along with the City of Chicago's red-light enforcement camera locations. Forty randomized intersections are selected to compare the before and after effects of the red-light traffic enforcement camera on total crashes, total injuries, and injuries per crash. The GPS locations of
the intersections were used as a center point to construct a geospatial map of a 135-ft. square around the center of each intersection. The geospatial squares are used to select the count rates for traffic crashes, injuries, vehicle and passenger characteristics at those intersections. A random intercept and zero-inflated negative binomial model are constructed to measure the effectiveness of red light traffic enforcement cameras in reducing total crashes and injuries at intersections. The results show a reduction of 8.4% in total crashes at forty randomized intersections with red light traffic enforcement cameras. A key finding is that geospatial areas sizes around intersections are a crucial factor in determining the counts of traffic accidents and the magnitude of traffic crash reductions by red light traffic enforcement cameras. More research is needed on appropriate geospatial sizes around intersections for accurately measuring reductions in total traffic crashes and injuries from red light traffic enforcement cameras.

53. Clark, Chase; Michael, Mullowney; Hernandez, Antonio; Patel, Milan; Sanchez, Laura and Murphy, Brian

**Innovating Microbial Libraries for Drug Discovery Using MALDI-TOF MS and the Cultivable Freshwater Sponge Microbiome.**

*Graduate / Professional - Medicinal Chemistry and Pharmacognosy*

Aquatic sponges (phylum Porifera) are sessile, filter feeding organisms that are among the oldest animals on Earth and harbor diverse microbial communities that can comprise 35% of the sponge biomass. Consequently, they are among the most prolific sources of natural products to date, with nearly 5,000 new small molecules reported in literature. However, most investigations have focused on marine sponges as opposed to their freshwater relatives. Furthermore, creating diverse microbial libraries from environmental sources such as sponges has historically been a blind, cumbersome process that relies on evaluation of colony morphology rather than phylogenetic identity and chemical phenotype. Since 2015 we have collaborated with citizen scientists to collect over sixty freshwater sponges from diverse locations across the Great Lakes. We indiscriminately isolated sponge associated bacteria and analyzed the strains using IDBac: an innovative mass spectrometry proteomics and metabolomics platform we developed to profile hundreds of cultivable bacteria from agar diversity plates. This rapid, semi-automated method has allowed us to group sponge-associated bacteria by phylogeny, similar to 16S rRNA gene sequencing analysis, while simultaneously providing information about small molecule production in situ. This represents a significant advance in creating microbial libraries rich in taxonomic diversity and functional chemistry; and has facilitated detailed studies on the cultivatable microbiome of an underexplored natural product source.

54. Clodius, Annabel and Swirsky, Eric

**Keeping The Hippocratic Oath Alive: How Requiring Medical Ethics In The Collegiate Pre-Medicine Curriculum Will Later Counteract Empathy Decline In Medical Students.**
In this article, the author explains the importance of incorporating medical ethics into the baccalaureate pre-medicine curriculum based on the current trend of empathy decline in medical students. She provides effective methods that medical schools have instituted in their medical programs to foster a more humanistic environment. Furthermore, she proposes that if empathy and medical ethics are so important, then they need to be required for undergraduate pre-medicine students. The author supports her claim by providing an example of how to structure a medical-ethics class. Methods: A systematic search was conducted for articles that fit the inclusion criteria and key words on three different databases: PubMed, NCBI, and Medline. The author sought research advice and consultation from both librarians and review experts. The inclusion criteria included reviews and primary research involving undergraduate and clerkship students in medical school. Key terms included empathy, medical ethics, medical education, medical students, and professional identity. Results: Twenty-seven articles met the inclusion criteria. Six articles were used to support the claim that empathy decline is a current issue. Fourteen articles provided methods in which institutions have successfully promoted humanistic attitudes into the curricula. Lastly, seven articles sufficiently supported the claim that medical ethics needs to be incorporated before medical school starts. Conclusion: When a patient-physician relationship is compromised from poor communication and a lack of empathy, problems arise. Empathetic attitudes are supported by a combination of personal reflection, case studies, visualization exercises, and medical ethics training. If empathy and humanism are as vital to medicine as the literature suggests, then they need to be taught in the pre-medicine curriculum. If pre-medicine baccalaureate students take medical ethics, their humanistic skills shall develop in time for their medical education. With this preemptive action, it is likely that empathetic medical practices and overall patient-physician satisfaction will improve.

55. Covington, James; Chowdhury, Juel; Batool, Khatja and Radosevich, James A.

Title: The Altered Expression of Small GTPase Genes Coincided with Alteration of the Phenotype in A549 Cells due to an Increase of NO Exposure.

Background: Previous experiments from this laboratory have demonstrated tumor cells adapted to high nitric oxide (HNO) exposure lead to tumor progression. HNO adapted cells are capable of growing in media lacking glucose, are more resistant to radiation, and more resistant to a broader range of temperature and pH. Our laboratory is currently investigating the genetic expression changes of HNO cells compared to the original parent cell line. Hypothesis: High NO adaptation alters expression of Small GTPase binding proteins and thereby influences the resulting phenotypic changes of HNO-A549 cells. Methods: The A549 lung adenocarcinoma cell line was the subject of experimentation. A549 cells were treated with an NO donor DETA-NONOate until adaptation to a lethal dose of NO. The parental A549 cells were preserved for the comparison with newly adapted HNO-A549 cells. A comparative DNA microarray was conducted between A549 calls and HNO-A549. Data from the analysis was processed using
Gene Oncology (GO) molecular function (UniProt) and proprietary big data software. Qualifying genes of interest provided a P value < 0.05 and a false discovery rate (FDR) of less than 0.024. Results: The expression of seven of sixteen genes were found to be significantly altered. ABCA1, FLNA, RILP, and TSC2 were all upregulated, while PEX5, RCC2, and RILPL2 were down regulated. Conclusion: HNO-A549 cells demonstrated a significant alteration in expression of genes essential to Small GTPase binding proteins. Small GTPase binding proteins regulate and monitor a host of cellular functions and many of the genes identified by our research have previous reports of being tumor suppressors, facilitating multi-drug resistance and participation in regulating cellular growth.

56. **Crable, Frances; Gorak, Karis; Yang, Samantha; Gonzalez-Meler, Miquel and Sturchio, Neil C**

**Wetlands Potential to Reduce Nutrient Pollution and Greenhouse Gas Concentration**

*Undergraduate - Biological Sciences*

Anthropogenic activities and urbanization are negatively affecting our water systems through industrial and city waste, sewage and agricultural runoff. These sources of waste are rich in nitrogen and phosphorus, which upset the ecosystems natural nutrient balance due to the addition of excess nutrients. Nitrogen and phosphorus are critical to the growth of aquatic life; however, when excess nitrogen and phosphorus enter the environment due to anthropogenic waste, water quality, resources and habitats are impaired. Wetlands can help mitigate the harmful effects of excess nutrients through processes that remove nitrogen and other dissolved organics such as denitrification. Wetlands can also sequester carbon through high rates of organic matter inputs and reduced rates of decompositions, reducing the CO2 emission from anthropogenic activities. In this study, water and nutrient dynamics were monitored in a 2500-acre wetland restored from farmland in Hennepin, IL and adjacent areas. Isotopic composition of soil and water (13C, 15N, 2H, 18O) was used to assess the plant, soil, and hydrological dynamics of the constructed wetlands to produce baseline data in order to optimize adaptive management strategies for water quality. We found that all wetlands were efficient in denitrification despite their environmental differences. Wetlands were also efficient in carbon sequestration due to high accumulation of particulate organic matter and slow decomposition rates. We conclude that restoring wetlands from agricultural land can be an efficient and useful way to mitigate the effects of anthropogenic activities and urbanization on our waterways through increasing denitrification and carbon sequestration rates.

57. **Czysz, Kamryn and Clark, Ginevra**

**Making Acids and Bases More Basic**

*Undergraduate - Chemistry*

In order to maximize student benefit from general chemistry labs, the labs must encourage student comprehension and reflection. Normally, titration experiments for general chemistry labs
fail to adequately stress how changes in pH affect the molecules in solution. Our goal was to modify an acid-base titration lab to give pre-health students a thorough understanding of the relationship between changes in pH and changes in molecular composition of amino acids. The students were instructed to first create models of molecular changes in amino acids throughout the titration. Then, students validated their models with in-lab observations. This approach follows the MORE (model, observe, reflect, evidence) pedagogy that allows students to relate in-lab macroscopic observations to their pre-lab molecular picture predictions. By using their observations as evidence to support or contradict their predictions, students can reflect upon their pre-lab models and correct any misunderstandings. This lab was used in a 100-level general chemistry course for pre-nursing students. To analyze the effect of the MORE pedagogy on student comprehension, we collected student work from before and after the MORE pedagogy was implemented. Then, we created a coding scheme which allowed us to quantifiably compare student comprehension. Our analysis shows an increase in student comprehension in two areas: first, between students with a standard acid-base titration lab and students with the reformed lab; second, between students’ pre- and post-lab models in the reformed lab.

58. Danemayer, Jamie

Research Barriers at UIC SPH

*Undergraduate - School of Public Health*

Background: UIC’s School of Public Health offers diverse opportunities for students at all levels (undergraduate, master’s, and PhD) to become involved in professional research. To improve the curriculum and SPH’s reach in Chicago communities and globally, impactful research is essential, and SPH faculty have the responsibility of expanding access to positions on these studies to all students. Methods: A survey was designed, approved by SPH’s Committee on Research (COR) administered via Qualtrics and SPH’s listserv to all levels of SPH students. The survey is anonymous and consists of 18 multiple-choice questions. Questions regarding SPH resources, faculty engagement, and lifestyle/coursework balance were asked (a full list of questions will be provided during the presentation). Data will be analyzed to observe trends associated with student levels and type of research involvement, and experiences with each study. Students are also provided opportunities to write in their own answers to ensure all experiences are included. Results: The survey is currently open with over 100 responses. It will close on March 3rd, and data will be analyzed to review any trends among student level, involvement type, and experiences. Research required for coursework will only be included in results if significant trends in experiences become evident. Discussion & Analysis: Recommendations will be made to SPH COR when results are available, in order to establish protocols and interventions to improve the undergraduate and post-graduate research experience in the School. This will help SPH enrollment, funding, and understanding of how to effectively return these benefits to SPH students. Expanding opportunities for public health students to engage with their field through community-based and globally-oriented research will produce
SPH graduates with strong critical thinking and empathy skills, and the ability to contribute significantly to public welfare.

59. Davis, Joseph; Geraghty, Joseph R. and Testai, Fernando and Loeb, Jeffrey

**Assessing the Relationship Between Neurobehavioral Impairment and Epileptogenesis in a Rodent Model of Subarachnoid Hemorrhage**

*Undergraduate - Neurology and Rehabilitation*

Stroke is a leading cause of death and disability worldwide according to the World Health Organization (WHO). Subarachnoid hemorrhage (SAH) is a devastating form of hemorrhagic stroke and occurs via the rupture of cerebral aneurysms. SAH carries extreme rates of mortality and morbidity and for those fortunate to survive, many experience mood disorders, fatigue, inability to return to work, long-term cognitive impairments, and life-long epilepsy. Currently there are no ways to predict which patients will develop epilepsy or behavioral impairments. We lack a strong mechanistic understanding of how these impairments develop. Moreover, we also lack detailed preclinical animal studies that would allow for mechanistic and therapeutic studies. The purpose of this study was to develop and optimize a novel preclinical model of post-SAH epilepsy and examine the relationship between epileptic activity and neurobehavioral impairments. To test this, we induced subarachnoid hemorrhage via endovascular perforation of the junction of the internal carotid artery and implanted subdural electroencephalography (EEG) electrodes. Our main hypothesis is that animals with a higher frequency of initial spikes and neurobehavioral impairment will exhibit an increased likelihood of going on to develop a chronic epileptic condition. Our preliminary data in a small cohort of pilot animals suggests that interictal spikes may immediately occur following injury in SAH animals which later develops into spontaneous generalized seizures. Yet, how post-SAH epilepsy effects behavior is still unknown. Thus, we are conducting a battery of behavioral tests to examine the effects of SAH and epilepsy on overall activity levels, fine sensorimotor function, anxiety-like behavior, and learning and memory. Yet, cognitive deficits could result either directly from the injury (blood), but could also result from the ongoing epileptic activity (spikes and seizures). Understanding how each contributes to cognitive defects could help design better treatment strategies for patients with SAH.

60. De Guzman, Franc Louie; Moukoulou, Louise Nathalie Ngalee; Scott, Linda D. and Zerwic, Julie J.

**LGBT inclusivity in Health Assessment Textbooks**

*Undergraduate - Biobehavioral Health Science*

Lesbian, gay, bisexual, and transgender (LGBT) people make up 4% of the adult population in the United States; however, it is unclear if there is sufficient material in nursing textbooks for students to learn how to provide care for sexual minority populations. A content analysis of two
commonly used health assessment textbooks was completed to identify material that prepared nurses for LGBT patient interactions. Topics such as gender neutrality, same-sex partners, and other terms referring to LGBT persons were considered LGBT content. Campinha-Bacote's The Process of Cultural Competence in the Delivery of Healthcare was used as the theoretical framework to assess the textbooks' content on five constructs: awareness, knowledge, skill, encounters, and desire to learn. Eleven pages in one text and 14 in the other had at least one line that addressed LGBT health assessment. Investigators found content related to the constructs of awareness, knowledge, and skill in both textbooks. In all cases, the content was limited in depth; both textbooks lacked exemplars and application of LGBT-specific health content. Inclusion of this information in textbooks or other learning resources is needed to enhance nurses' cultural knowledge and skill to improve health care outcomes within this vulnerable population.

61. Deeb, Lazma; Tao, Qian; Jursich, Gregory and Takoudis, Christos

**XAFS Analysis of Atomic Layer Deposited Hafnium Oxide Films on Silicon Oxide and Copper Substrates**

*Undergraduate - Biological Sciences*

Over the years, there has been an increased demand for minimizing electronic devices; this requires new and advanced materials. One of these materials is an ultrathin film of Hafnium Oxide (which is of interest for gate dielectrics of transistors and diffusion barriers for copper interconnects. These interconnects serve as the wires that connect the stacked layers of dense circuits. Prior to this study, ultrathin layers of were prepared by atomic layer deposition (ALD) onto copper and oxidized silicon substrates where selective deposition has been observed. This selectivity is essential for the to serve as the diffusion barrier of the copper interconnects. The goal of this work is to examine the bonding structure of the on these two different substrates as a function of film thickness. Given the amorphous nature of these ALD films, X-Ray diffraction is not capable of determining bonding structure. For this reason, X-Ray Absorption Fine Structure (XAFS) is used to analyze neighboring atoms of the atom in ALD films in order to determine if the local bonding structure is influenced by the different substrates. In this work, the XAFS studies show that the data fits well to a monoclinic model out to two atomic shells with little difference between the two substrates: copper and silicon. Given the similarity of the bonding structures, we anticipate the physical properties of the film to be maintained down to 2 nanometers of thickness on either substrate and once initiated, the film growth by ALD follows a similar pattern for either substrate.

62. Del Rosario, Jolene and Marone, Jane R.

**Working While in School: Does This Influence Academic Motivation?**

*Undergraduate - Kinesiology and Nutrition*
Previous research studies examining the relationship between college student employment and academic achievement have mixed findings in whether employment influenced student academic achievement. Between motivation and academic achievement, studies have found no influence of motivation on achievement except for extrinsic motivation. However, studies that have explored the extent that employment plays a role in student motivation remains limited. The current study seeks to identify the relationship between the number of hours students work versus motivation to study, and whether differences exist between motivation levels among working and non-working students. Seventy-five undergraduate students enrolled in a 200-level anatomy and physiology course completed a survey that included questions regarding their major, credit hour enrollment for the Fall 2017 semester, and number of hours worked including anticipated hours. The survey also included three motivation questions on self-perceptions of personality characteristics, study seriousness, and goal setting as they related to students' work and/or study habits for the course. Motivational components were selected from the Achievement Strivings Scale. The results showed that the relationship between each motivation factor and number of hours worked was not significant. Additionally, the motivation to study did not differ significantly between working and non-working students. A post hoc analysis showed that students who did not work during the semester enrolled in significantly more credit hours than working students. The present study indicates that students, regardless of employment status are similar in their motivation to study. More importantly, our findings suggest that factors other than motivation to study are associated with students' choice to work.

63. Delgado, Adrian

**People v. Horton and its Social Context**

*Undergraduate - Criminology, Law, and Justice*

Police play an extremely important role in our society, and it is of the utmost importance that we hold our officers to the highest standards. However, this is not possible without the proper laws in place to guide police activity. People v. Markell Horton revolves around a story that is situated on Chicago’s South Side. In a city that is plagued by gun violence, most citizens place the weight of this massive problem on the shoulders of the officers at the Chicago Police Department. As such, police officers must themselves in a balancing act that on one end consists of protecting the rights of citizens, while also keeping their city as safe as possible. This is one of the most influential cases in Illinois in recent years, with a ruling that has had major impact on how police officers can interact with citizens that they suspect may have committed a crime. This case establishes a precedent that is meant to protect citizens from unjustified harassment by police officers.

64. Dodd, Emily; Pierce, Melissa L.; Lee, Jon. S.F. and Poretsky, Rachel S.

**Larval Sablefish (Anoplopoma Fimbria) Skin Microbiome Shifts Microbial Communities in Tanks**
The microbes on the outer tissues of an organism are the first line of defense against disease, and disruptions due to stress, diet, or environmental factors can put the host at risk for infection. In marine fish, the skin microbiome is established in early development and is thought to reflect the bacteria in the surrounding seawater. The environmental factors that shape the larval skin microbiome are especially important in aquaculture, where water additives are often added to promote larval growth and survival. Algal additives are expensive and can promote bacterial growth, but they can also provide an additional source of nutrition to larvae as they adjust to hunting live feed. Clay additives are cheaper but have been associated with low growth and survival in sablefish. In an experiment with 6 tanks supplemented with algae (GG), 6 tanks supplemented with clay (CC), and 6 tanks supplemented with algae with a switch to clay after 1 week (GC), we examined the microbial communities of tank water and larval sablefish skin. The larval skin microbiome changed over time in the same way regardless of water treatment or parental cross and was mostly dominated by families Oceanospirillaceae, Rhodobacteraceae, Pseudoalteromonadaceae, and Colwelliaceae. The microbial communities in the water were significantly influenced by treatment, but the introduction of larvae into the tanks also created a stark shift in the water from a diverse seawater microbial community to one that resembled sablefish skin. Clay tanks reflected larval skin communities within 1 week of larval introduction in both the GC and CC treatments. Algae tanks began to resemble larval skin after 2 weeks. This suggests that the larval sablefish skin microbiome is more resilient to different environmental conditions than are the water microbial communities. This also demonstrates the ability of a host microbiome to shape surrounding microbial communities.

65. Douglas, Alyxandra

Collecting & Compartmentalizing the Objects that Define our Identity

The importance of reflecting on one's life moments, big and small, is important for our society because to know where you’re going, you need to know where you’ve been. Collecting objects is a way to illustrate how you’ve created who you are. Objects are an extension of ourselves – when one loses identity, reflecting on our objects is a way to reconnect with yourself. At least one third of people collect something, and no single motivation will explain such a widespread phenomenon, and no single means of deriving pleasure from collecting will pertain to all collectors. But our current method of collecting doesn't encourage reflection. I’ve created a system of containers to compartmentalize experience objects, souvenirs, gifts, keepsakes, trinkets, and family heirlooms. The set of containers consists of different materials, shapes, weights, and transparencies. Each shape and material is intended to represent different situations, people, feelings or chapters of life. Users are encouraged to make their own judgements about what to store in each container. The system encourages self-reflection with ease, creates an opportunity to share memories and moments with others, gives the user the option to
compartmentalize (or not), forms a beautiful object that lives out in the open, and keeps private memories hidden if desired.

66. Douglas, Quinasia

Reactions to Discrimination when Framed as In-Group Favoritism versus Out-Group Derogation

Undergraduate - Psychology

People often fail to empathize and may even feel pleasure in response to out-group targets' misfortunes (Cikara & Fiske, 2015). This might especially be the case when out-group misfortunes are framed in terms of in-group gains (Kuppens & Yzerbyt, 2012). In the United States, this different framing can be seen through the efforts of white supremacist groups to rebrand themselves as favoring white nationalism (promoting the goals of the in-group) instead of oppressing racial minorities (suppressing the goals of the out-group), even though they maintain agendas that harm racial minorities. One unanswered question is whether this rebranding has worked to make outsiders more accepting of white nationalist agendas and less empathetic toward those who are disadvantaged as a consequence. I predict that framing discrimination as favoring the in-group vs. harming the out-group increases acceptance of discrimination and decreases empathy for those who are discriminated against. I am going to run an experiment. Subjects will read reports about the RAISE Act, which is a piece of US legislation, which if approved, will decrease legal immigration. Subjects in the control condition will read a report that just states the facts in the policy. There are two experimental conditions. In one experimental condition, the report will include a supportive statement from a white nationalist who agrees with the policy because they believe it helps white people (in-group favoritism condition). In the other experimental condition, the policy will include a supportive statement from a white nationalist who agrees with the policy because it discriminates against minorities (out-group derogation condition). Subjects will answer questions about how much they support the RAISE Act, how they feel towards other people who support the RAISE Act (e.g., white nationalists) and how they feel about people who are negatively affected by the RAISE Act. I predict that subjects in the in-group favoritism condition are going to support the RAISE Act more, feel more positively toward others who support the RAISE Act, and feel more negatively about those who are negatively affected by the RAISE Act than subjects in the out-group derogation condition.

67. Duncan, George; Mathew, Merine Lucy L.; Yantis, Caitlyn and Bonam, Courtney

The Effect of Neighborhood Race on Individual’s Perception of Environmental Pollution and Willingness to Provide Aid

Undergraduate - Psychology
In 2014, Michigan governor Rick Snyder approved the use of new water pipes from the Flint River to supply water to Flint. This resulted in numerous health issues including, dangerously high levels of lead in the drinking water. Flint has a racial minority, so minorities were most affected. Previous research suggests that space-focused stereotypes are activated when individuals associate a physical space with a race, and that people tend to stereotype white areas as clean and well maintained while black areas are seen as dirty and rundown. This study explores how neighborhood race can shape people’s perceptions to individual and environmental harm with a crisis similar to Flint’s. We predicted that participants would perceive black neighborhoods as more industrial than white neighborhoods, and as a result they would perceive black individuals as less harmed. We hypothesized that white individuals would feel connected to white neighborhoods and participants would be more willing to help the white neighborhoods. 197 white Americans completed the experiment online and were randomly assigned to 1 of 4 neighborhood profiles: (Black/White and low/middle class). They read an article about water contamination in this neighborhood and responded to emotional measures. A 2-way between subjects ANOVA showed that participants did feel more connected to the white neighborhoods (p<.001). However, they perceived black individuals as more harmed and were more willing to help black neighborhoods, contrary to our hypotheses. An indirect effect between race and willingness to help was seen (p<.05), suggesting that because black neighborhoods were more harmed, individuals wanted to help them more. This shows that individuals may believe that black neighborhoods need more help, but ambiguous discrimination could play a role in this study. More research needs to be done to examine the relationship between environmental pollution, race, and willingness to help.

68. Dusane, Shamali and Bhatt, Tanvi

**Does prior stance slip-perturbation training augment or mitigate the recovery response to a novel stance trip-perturbation in chronic stroke survivors?**

*Graduate / Professional - Physical Therapy*

Background: Evidence suggest that chronic stroke survivors, demonstrate a potential for acquiring reactive adaptations to external perturbations. However, there is limited evidence on generalization of such motor adaptation to different contexts. For example, the influence of sensorimotor adaptation when exposed to a diametrically opposite types of perturbation is unknown. Thus, the aim of this study was to examine whether prior slip training would mitigate (interfere) or enhance (generalize) the recovery response to an unexpected novel trip perturbation in chronic stroke survivors. Methods: 29 community dwelling stroke survivors were assigned to either training group (n=13) or to control group (n=16) which only experienced a single novel unannounced backward trip-like perturbation (TC). The training group received an initial block of 8 slip-like stance forward perturbations (S1-S8) followed by a novel backward trip perturbation (T1). ActiveStep (Simbex) motorized treadmill was used to induce perturbations during standing. Body kinematics was recorded using the 3D Motion analysis system. The following variables were computed and analyzed: Falls, number of steps, center of mass (COM)
stability, its position and velocity relative to the base of support, step length and trunk angle. The
COM stability was calculated as the shortest distance from the COM motion state to the
backward computational threshold of the feasible stability region and normalized to the length of
this region. Such a measure would allow a uniform scale for comparison of stability during
opposing perturbations. Higher values of stability (>1) indicate greater forward instability and
lower values (<0) greater backward instability with value between 0 and 1 being optimally
stable. Paired t-tests were used to compare parametric variables between S1 –S8 and T1.

Independent t-tests were used to compare outcomes between T1 and TC. Nonparametric tests
were used to compare the falls and number of steps. Results: The training group demonstrated
significant adaptation to the repeated slips from the 1st to last trial with reduced number of steps,
and a longer 1st compensatory backward step length to position their COM anteriorly, resulting
in a significant increase in reactive stability and thus, decrease in fall rate (p<0.05). These rapid
adaptive changes were positively transferred to the recovery response from the novel trip (T1) in
which participants demonstrated lesser falls and number of steps, with a longer compensatory
forward step, a more posterior COM and decreased trunk flexion than the control group,
resulting in the training group having lesser forward instability (T1<TC; p< 0.05). Conclusion:
The results indicate that the training group performed better than the control group, on exposure
to an unexpected novel trip. The results suggest that chronic stroke survivors can accurately
adapt to repeated slip perturbation training and furthermore, demonstrate generalization to an
opposing trip perturbation.

69. Edomwande, Yuwa

Doffing Patterns Among Healthcare Workers

Undergraduate - Environmental and Occupational Health Sciences

Background: Healthcare workers wear personal protection equipment (PPE) such as gloves and
masks to protect themselves and others from potentially infectious body fluids during care of
patients with infectious diseases. The proper removal of PPE, doffing, is also essential in
reducing the risk of spreading infectious diseases because it keeps workers from contaminating
their clothing and bodies. Methods: Seven participants employed as healthcare workers and
environmental service technicians were instructed to clean simulated vomitus in a room-scale
chamber as they usually would under normal circumstances. Gloves, goggles, masks, shoe
covers, and head covers were made available to each participant. Participants were instructed to
use whichever PPE they would utilize under normal circumstances. At the end of each trial,
participants were instructed to doff PPE as they would under normal circumstances. The
simulated vomitus contained fluorescein that was measured on the floor after cleaning, indicating
cleaning quality. Results: Gloves were doffed first 61% of the time. Goggles were doffed second
38% of the time. Masks were doffed third 45% of the time. Shoe covers were doffed fourth 7%
of the time. The biggest error in doffing gloves and goggles was the sequence. Incorrect doffing
sequence and doffing with flourish were the largest sources of error in doffing masks and shoe
covers. There was no observed association between cleaning quality and whether the participants
doffed any item of PPE correctly (p > .05). Conclusion: There is a need to better train healthcare workers in standardized doffing practices. Although no association between cleaning quality and doffing accuracy was found, the gloves of all participants were found to be contaminated with fluorescein, which is an opportunity for contamination of worker’s bodies and clothing during incorrect doffing. Healthcare workers should observe proper PPE donning and doffing guidelines.

70. Ejupovic, Jasmina and Zinsser, Katherine

**Fostering a Sense of Belonging in College Freshman Using Social and Emotional Teaching Practices in the Classroom**

*Undergraduate - Psychology*

The transition from high school to college is one with many challenges for incoming freshman. Meanwhile colleges and universities aim to increase student retention and the college experience overall by alleviating challenges. One approach to alleviating college students’ stress is utilizing social and emotional learning (SEL). SEL can also be fostered through peer interactions, interactions with faculty, and emotional support. Another approach is fostering sense of belonging. Research has shown that a sense of belonging in college is associated with many positive outcomes, including academic motivation and success; however, the research on factors that foster a sense of belonging is minimal. Moreover, this research has indicated that these relationships are difficult to build particularly in STEM fields. Therefore, looking into the contributing factors to promotion of sense of belonging is critical in order to understand the high attrition rates of college freshman and STEM students. The research into a potential connection between freshman success in the STEM fields, their sense of belonging, and the impact of social and emotional teaching, is imperative. This research project will aim to observe freshman introductory science classes, specifically looking at instructor practices that foster a sense of belonging and utilize social and emotional teaching. These actions will be coded and correlated with student ratings of teacher effectiveness and overall course evaluations using the end of the semester evaluations. The final paper will delve into literature regarding social and emotional learning, sense of belonging, and instructor practices in higher education while using the data to support the hypothesis that promoting a sense of belonging through social and emotional teaching will increase students’ perceptions of teacher effectiveness and overall course evaluations.

71. Elagha, Noor; Burkett, Candice; Blair, Alyssa and Goldman, Susan

**Effects of Math Anxiety on Identification of Discrepancies in Scientific Text and Graph Comprehension**

*Undergraduate - Psychology*
Disciplinary literacy in math and science has become increasingly important in recent years (Harsh & Schmitt-Harsh, 2016). Science literacy is dependent upon critical evaluation of multiple representations because scientists frequently display data and other mathematically relevant information using multiple representations (e.g., equations, tables and graphs) (Lee & Spratley, 2010). Researchers often consider contradiction detection to be an indicator of such critical evaluation (Stadtler & Bromme, 2014). A vital part of both scientific and mathematical literacy is the ability to comprehend and evaluate graphs. Studies show that comprehension of graphs is weakened in individuals with math anxiety who are primed with mathematical material (Silk & Parrot, 2014). This is partially because math anxiety significantly hinders working memory and causes individuals to do worse on mathematical tasks (Hopko et al., 1998). Because math anxiety negatively impacts graph comprehension, it stands to reason that such anxiety would also impact the ability to detect contradictions involving graphs. Accordingly, the purpose of this study was to measure the relationship between math anxiety and undergraduates’ ability to identify contradictions between more and less complex scientific texts and graphs.

Undergraduates (N=32; 31% Male, Average age = 20) were given a packet with two sections: 1) math questionnaire, and 2) contradiction detection passages. The math questionnaire contained thirteen math problems participants solved without a calculator. These problems were created based on the Math Anxiety Rating Scale (Sunin & Winston, 2003) and were designed to induce math anxiety. Participants reported their anxiety levels before and after the math section on a scale of 1 (not at all anxious) to 7 (extremely anxious). The contradiction detection section contained four scientific passages with accompanying graphs. Participants were asked to answer “yes” or “no” whether the information in the text matched the information in the graph, and to justify their conclusion. Researchers manipulated (within-subjects) whether graphs were consistent or contradictory with the texts and whether graphs were more or less complex (between-subjects). We predicted that participants who reported higher levels of math anxiety would be less likely to identify contradictions between the text/graph pairs than participants with lower anxiety. We also predicted that participants would be less likely to identify contradictions for text/graph pairs that included more complicated than less complicated graphs and that the impact of math anxiety on contradiction detection would be more pronounced when graphs were more complex. Preliminary results indicate a relationship between math anxiety and contradiction detection.

72. Engelbert, Kevin; Chou, Luoth; Kenig, Fabien and Jackson, Andrew

Removal of Oxychlorines from a Potential Mars Analog, Lake Vida (Antarctica) Brine, for further analysis of organics on Mars

Undergraduate - Earth and Environmental Sciences

The Martian surface contains oxychlorines (ClO4- and ClO3-) which present a challenge in detecting organics on the surface of Mars with rover operations. Removal of oxychlorines on Earth are done through strong base anion-exchange (SBA). Thus, we attempt to use a SBA resin (Purolite® & Lewatit® Monoplus) on Mars analogs such as a brine under frozen Lake Vida of
Antarctica (LvBr) to remove perchlorates and chlorates. This brine contains elevated levels of perchlorates, compared to other aquatic systems on Earth, and may be used as a proxy for samples of Mars brines. Samples analyzed contain 1 wt% perchlorates, 1 wt% chlorate, and fatty acids C6-12 (to simulate diagnostic biomarkers for terrestrial life). These samples and LvBr are loaded into an ion exchange chromatography column, containing the SBA resin. The resin absorbs ClO4- as described in the chemical reaction: Resin-Cl- + ClO4- ↔ Resin-ClO4- +Cl-. We analyze the effectiveness of the oxychlorine removal system using an ion chromatography system. The effective removal of oxychlorines in terrestrial samples could allow for this method’s utilization in future Mars missions. The use of mini-solid phase extraction cartridges (SPE) can increase the mobility and reduce the size that column chromatography requires. Future experiments will utilize the SPE cartridges and attempt to analyze their efficiency.

73. Engels, Chloe

**The Creation of a Computer Program: To Aid in Solid Rocket Propellant Research**

*Undergraduate - Mechanical and Industrial Engineering*

A computer program was created using the Fortran programming language to aid researchers investigating the effect of the cross-sectional geometry of solid rocket propellant on rocket performance. Burn rate and the even distribution of rocket propellant combustion is affected by the cross-sectional geometry of the propellant. As the surface area increases, the burn rate decreases. In this investigation, a Fortran computer code was created to plot the cross-sectional geometry of a 5-point star and investigate the area fractions of the consumed rocket propellant within the area of the star.

74. Enriquez, Luis; Perez, Lillian and Alfonso, Aixa

**The effect of no hlh-3 function on body wall muscle function in C. elegans**

*Undergraduate - Biological Sciences*

Basic Helix-Loop-Helix (bHLH) proteins have been identified in a variety of multicellular organisms. These proteins are transcription factors that regulate cell fate in many tissues including the nervous system. They usually work as heterodimers comprised of a ubiquitously expressed Class I bHLH protein and a specific Class II bHLH protein. In the nematode C. elegans there are 14 Class II bHLH proteins. The Alfonso laboratory has shown that the function of the Class II bHLH protein encoded by the gene hlh-3, HLH-3, is important for terminal differentiation of neurons in both C. elegans hermaphrodites and males. This gene is expressed in all neural precursors but surprisingly only subsets of neurons, those with roles in sexual behaviors, appear affected in their function when HLH-3 function is compromised. Others have shown that C. elegans males are generally faster than hermaphrodites and this behavior requires the coordination of sensory neurons and body wall muscles shared between the two sexes. Given these observations we wondered whether hlh-3 mutants have defects in muscle cell function too.
Locomotion may be affected depending on the sex of the muscle. We hypothesized that if muscles are abnormal in these mutants a locomotion assay will reveal the defects. Levamisole is an acetylcholine receptor agonist. It is known that exposure to levamisole results in quicker paralysis in wild type male worms than hermaphrodite worms. This project addressed whether hlh-3 mutant males and hermaphrodites responded to levamisole in the same or different way than wild type males and hermaphrodites. Multiple synchronized L4 staged males (n>10) and hermaphrodites were placed within a 30 microliter drop of 50mM levamisole; worms were separated by sex and genotype, and the total number of worms paralyzed was recorded every 15 minutes for a period of 90 minutes. We will present the results and our interpretation.

75. Enzien, Grace and Shim, Yoonjung

**Reconstitution of Histone Octamer and Nucleosome for Rad4-Rad23 Binding Assay**

*Undergraduate - Chemistry*

The nucleosome core particle (NCP) is composed of two superhelical turns of DNA that wraps around a histone octamer (two of each subunits: H2A, H2B, H3, and H4). NCP is required in order to perform binding assays with constructs YS63 and 144, which are composed of TFIIH (subunits: Ssl2, Rad3, Tfb1, Tfb4, Ssl1, Tfb2, and Tfb5) and Rad4-Rad23 along with tfb1, respectfully. Rad4-Rad23 and TFIIH interact with one another during Nucleotide Excision Repair (NER), which is a DNA repair mechanism that repairs damage to DNA caused by UV light. In order to prepare NCP, dialysis had to be preformed using DNA and histone octamer. We performed two different methods to make histone, with the first method involving the purification of each of histone’s four subunits and then recombined into one histone octamer. The second method involved construct YS14, which was already composed of the histone’s four subunits, but needed to be purified. After completing histone preparation, NCP dialysis was performed in two methods with three different type of DNA (A, no mismatch; B, mismatch; 601 DNA). The first dialysis method used was step-wise because it consisted of three buffers with decreasing salt concentration, which were performed for three hours each in the first two buffers and than overnight in the last buffer. The second dialysis method was gradual because the low buffer (low salt concentration) was gradually introduced into the high buffer (high salt concentration) solution, which at the same time was removed from solution (.8 mL/min). Both dialysis methods used the same ratios of DNA to histone and were confirmed using 6 % native gel and gel doc. Of the two histone methods, the second method produced purified protein and of the two dialysis methods, the second produced NCP.

76. Erickson, James

**Superpolitik: Superheroines and the United States Social Climate**

*Undergraduate - English*
This project examines the way in which the social climate of the United States impacts the creation and development of superheroines in DC and Marvel comics. Over the last ten years, role of the superheroine in DC and Marvel comics has evolved from a diminutive focal point to a beacon of social change. This project examines recent critiques of comic book literature as well as in depth analysis of the social movements that have spurred an influx new superheroines and female comic book creators. Provided in this paper are four character studies that explore ways in which familiar heroines have developed over time and also what the genesis of new superheroines, such as Kamala Khan, mean for the future of comic book literature and United States society as a whole.

77. Ewa, Theressa; Ricketts, Michael and Gonzalez Meler, Miquel.  
**Gene Abundance and Carbon Cycling in Microbial Community**  
*Undergraduate - Biological Sciences*  
It is generally accepted by scientists that the climate is getting warmer, and colder layers of soil (like permafrost) are thawing. Permafrost soil contains ~50% of the soil carbon (C) on the planet, about twice the amount that is in the atmosphere. Also, changing climate patterns are increasing the winter precipitation in the Arctic, increasing snow depth that acts like a blanket to insulate the soil from cold air temperatures. This means that soil with more snow would experience a higher thawing rate of permafrost. Soils that have higher temperatures are expected to have increased microbial activities due to increased enzyme kinetics and access to previously frozen organic matter. This research seeks to determine how functional gene abundance of microbiomes will be affected by increased snow accumulation caused by climate change. Thus, we seek to answer these two main questions: 1) Can measuring the gene abundances of enzymes required for decomposition help predict rates of decomposition in soils? 2) If so, can that help us to better understand how climate change affects C cycling in soils? It is hypothesized that soil that is covered in deeper snow would have higher abundances of genes used to metabolize soil organic matter compared to soil covered by shallower snow because higher temperature means more access to thawed soil and increased rates of metabolism, and thus higher microbial activities.

78. Fabian, Karina  
**The Effects of Big Data Analytics and Visualization on the Role of Public Accounting Firms**  
*Undergraduate - Accounting*  
This paper focuses on how big data analytics and visualization has changed the role of public accounting firms. Big Data within the past 10 years has become an immensely important topic for all industries and in accounting, the implementation of data analytics tools such as Access, Tableau and many other visualization tools helps public accountants have become much more of a business consultant role than that of a compliance tool used by many companies. In tax, accountants are able to complete the compliance work but also forecast and prepare for any
upcoming tax reform changes. In audit, the accountant can provide the users of financial statements with much more reliable review's because these analytics tools are able to process entire transactions sets rather than a few random set of transactions as has been done previously. And finally, in advisory, the accountant can help companies derive useful information from their own internal data by implementing dashboards and interfaces so that management can easily see any anomalies in their data. This continuing trend has been noticed by many of the "big four" public accounting firms with their implementation of continuing learning opportunities that they offer and in anticipation of this shift current accounting students should consider what skills they can learn to help them during their career.

79. Faundez Chacon, Luis

Impact of a Chilean Maternity Leave Expansion on Female Labor Market Outcomes & Discrimination

Graduate / Professional - Economics

There are important gender differences in the labor market, and in the case of Chile these differences are particularly large. In 2003, the labor force participation gender gap was 40 percentage points and the gender pay gap conditional on schooling and experience was approximately 35 percentage points. One possible explanation to these gaps is maternity. Maternity leaves seek to facilitate maternity, but at the same time impose higher costs of hiring women, especially childbearing age women. The effects of maternity leave benefits on labor market outcomes have been widely studied for developed countries, especially European countries. However, there is little evidence for less developed countries. This paper uses a policy change in Chile, that in 2011 increased the paid maternity leave period from 18 weeks to 30 weeks to study its effects on labor market outcomes of mothers of newborns, such as employment and relative labor income, and on labor market discrimination against women. Using a difference-in-differences approach that compares outcomes of women having a child younger than one year old to outcomes of women with no child younger than one year old before and after the passing of the reform in 2011, I find evidence that the aforementioned policy increased employment of mothers of a child younger than one year old by 6.5 percentage points with no statistically significant impact on their relative labor income. However, by comparing outcomes of childbearing age women to those of older women before and after 2011, I find that this maternity leave expansion had an unintended consequence for childbearing age women: it decreased their labor force participation and employment by 3 and 2.4 percentage points, respectively, while it had no effect on the gender pay gap.

80. Fayyaz, Nida

A Focus Group Study On the Perceptions and Attitudes of Diversity at UIC of First Generation American Muslims.
The diversity at the University of Illinois at Chicago is one of its main attractions to prospective students. Statistically, there is a great deal of diversity at UIC across all definitions of the word. But having differences on a campus does not automatically equate with a community that flourishes because of those differences. Instead, members of the community have to work together to mold the environment into one that thrives on the differences to maximize learning and experiences for all members. If this does not occur, members of the community will not feel the positive effects of diversity. This present study aims to analyze the perceptions about diversity and inclusion held by first generation Muslim American Students at UIC to study the climate of the community. Their responses to questions about equity and inclusion on campus are compared to the mission statement proposed by the Office of Diversity. The results of this research can be used to determine how well UIC has meet its diversity goals and what avenues should be taken in the future to further improve the UIC community.

Fernandez, Agatha; Bark, John; Dowty, Shannon and Maki, Pauline

Determining the Prevalence of Perinatal Depression in a Diverse, Urban Population Using PHQ-9 and CAT-MH

Perinatal depression is common during pregnancy affecting 10-25% of women in the United States, especially among Non-Hispanic Blacks (NHB) and Hispanics compared to Non-Hispanic Whites (NHW). The Patient Health Questionnaire-9 (PHQ-9) and Computerized Adaptive Tests for Mental Health (CAT-MH), which contains a diagnostic screener for MDD (CAD-MDD) and a measure of severity of depressive symptoms (CAT-DI), are used to screen pregnant women for major depressive disorder (MDD). To determine the prevalence of MDD in a diverse, urban population, the rates of MDD diagnosis on CAD-MDD, the rates of elevated PHQ-9 scores indicative of possible MDD, and the rates of both combined were examined. Pregnant women receiving perinatal care at University of Illinois Hospital and Health Sciences System (UIHHSS) obstetric outpatient clinic completed the PHQ-9 and CAT-MH at to three-time points (initial obstetric visit, third trimester visit, and postpartum visit). Independent samples t-test was conducted to compare PHQ-9 scores between NHW and NHB/Hispanic women. To compare the demographic characteristics of the participants, chi-square tests were conducted. The rate of MDD on the CAD-MDD was 14.8%, the rate of depression on the PHQ-9 was 7.2%, and the rate of both combined was 5.5% (53.8% NHB; 30.8% Hispanics). The results of the independent-samples t-test comparing PHQ-9 scores between NHW and NHB/Hispanic women showed no significant difference in the scores of NHB/Hispanic women (M=4.18, SD=4.17) and NHW women (M=4.31, SD=3.43); t (257)=0.18, p=0.860. CAD-MDD detected more women with probable MDD than PHQ-9, but there were no differences in perinatal depression by race, contradicting results reported from previous studies.
82. Fernandez, Isalys

Self-Efficacy in Entrepreneurs with Disabilities

_Undergraduate - Disability and Human Development_

After high school, individuals with disabilities are often left at a crossroads regarding what to do in their lives. Some individuals go to day programs, some seek traditional employment, and others start their own businesses. Through entrepreneurship, people with disabilities are able to set goals and work at a pace that suits their abilities, something that is not too common in the work force. According to the Department of Labor, people with disabilities are twice as likely to pursue entrepreneurship (14% pursue entrepreneurship vs 8% of those w/o disabilities) at some point in their life as a person without disabilities (8%; Department of Labor, 2015). The purpose of this preliminary exploratory analysis was to study the self-efficacy of entrepreneurs with disabilities who received services from the Artfully Gifted Foundation in different subsets including how long they have received services, how long the business has been running, and how many hours a week was committed to their business. The Artfully Gifted Foundation supports entrepreneurs with disabilities by providing office space, mentorship, and funding free of charge. Self-efficacy is defined as one's belief in their ability to use their motivation and resources to successfully run their businesses. It was measured using a 10 question Likert-style questionnaire which was completed by email and in-person. Respondents were both male and female, aged between the ages of 21 and 30, and also had physical, developmental and intellectual disabilities. Because of the fact that the research is in the preliminary stages, it was difficult to recruit a large sample size of willing and qualified respondents to the survey. An early conclusion would suggest a higher self-efficacy score based on how long the business has been running, and time spent working on business.

83. Flores, Yoselyn; Haynes, Vena and Ward, J. Evan

Clearance Rate of Blue Mussels (Mytilus edulis) Exposed to Surfactant-Coated Microplastics

_Undergraduate - Biological Sciences_

Suspension-feeding mollusks (e.g., bivalves) play a key role in improving the water quality of coastal environments by filtering out suspended matter from the water column. Microplastics are becoming ubiquitous in the marine environment, so it is important to understand if these particles affect feeding processes of bivalves. Additionally, previous studies regarding the impact of microplastic on bivalve physiology have not independently tested for the effects of surfactants which are often added to commercially available plastic particles to prevent aggregation. We measured the clearance rate of mussels (Mytilus edulis) exposed to one type of microplastic and three common surfactants. Mussels were given a dose of microalgal food (1 x 10^4 cells/mL) and 10-µm polystyrene spheres (Polybead; 1 x 10^4 beads/mL). Experimental treatments tested were washed microspheres and microspheres coated with each of the following surfactants at a concentration of 2mg/L: triton X-100, benzalkonium chloride, and sodium dodecyl sulfate. These
surfactants are nonionic, cationic, and anionic, respectively. Control mussels were given a microalgal diet only (2 x 10^4 cells/mL). Each mussel was placed in an individual 1-L chamber and exposed to one of the aforementioned treatments. Water samples were taken at the start of the experiment (t=0) and then every 10 minutes for 30 minutes to determine clearance rates. Particle concentrations were measured using an electronic particle counter (Coulter Counter) at an appropriate size range for the algae and microspheres. Our results indicate that microspheres with or without surfactant had no effect on clearance rates of mussel compared to those of the controls. Further, our research suggests that the use of polystyrene microspheres in future experiments without initial washing does not affect the clearance rate of mussels.

84. Fuka, Mark

**Ecological Disservices Among Insectivorous Prairie Birds and the Corresponding Negative Impacts on Soybean Crop Yields**

*Undergraduate - Biological Sciences*

Crop yields can be positively or negatively impacted by trophic interactions between insectivorous prairie birds and their consumption of arthropods. Ecological disservices pose a threat to the economic output of soybean fields. In contrast, ecological services create beneficial impacts on an ecosystem. Beneficial arthropods consume pest-insects that feed on plant material while prairie birds can create a disruption by consuming a higher proportion of beneficial arthropods than pest-insects. We hypothesized that insectivorous prairie birds provide an ecological service to crop yields by consuming a higher level of pest-insects compared to beneficial arthropods. To test this, we chose soybean fields adjacent to native prairies to place exclosure structures. Exclosures kept out prairie birds while allowing access to the crops by beneficial and pest arthropods. We placed control plots adjacent to each exclosure treatment to observe the effects that birds had on damage to crops by insects. We recorded percent defoliation values, scored them, and analyzed them using an analysis of variance to determine if there were significant treatment effects. Our results show that treatment and plot location had a significant effect on defoliation. Percent defoliation values were higher in control plots when compared to exclosure plots and higher in edge plots compared to interior plots. This suggests that control plots and edge plots contained higher amounts of beneficial arthropod consumption by prairie birds. We then postulate that insectivorous prairie birds generate an ecological disservice to soybean crop yields by consuming a higher number of beneficial arthropods and aphids rather than pest-insects. More research is required to determine the amount of economic damage that this disservice creates for farmers. In addition, questions regarding the ability to control these trophic interactions require more research into the population dynamics of insectivorous prairie birds and pest-insects.
85. Gabel, Kelsey and Varady, Krista

**Effects of 8-hour Time Restricted Feeding on Body Weight and Metabolic Disease Risk Factors in Adults With Obesity**

*Graduate / Professional - Kinesiology and Nutrition*

Objective: Time restricted feeding decreases energy intake without calorie counting and may be a viable option for weight loss. However, the effect of this diet on body weight in subjects with obesity has never been examined. This study investigated the effects of 8-h time restricted feeding on body weight and metabolic disease risk factors in adults with obesity. Methods: Subjects with obesity (n = 23) participated in an 8-h time restricted feeding intervention (ad libitum feeding between 10:00 to 18:00 h, water fasting between 18:00 to 10:00 h) for 12 weeks. Weight loss and other outcomes were compared to a matched historical control group (n = 23). Results: Body weight and energy intake decreased in the time restricted group (-2.6% ± 0.5; -341 ± 53 kcal/d) relative to controls over 12 weeks (P < 0.05). Systolic blood pressure decreased in the time restricted feeding group (-7 ± 2 mm Hg) versus controls (P < 0.05). Fat mass, triglycerides, fasting insulin, insulin resistance, and homocysteine decreased over time with time restricted feeding (P < 0.05 for main effect of time, no group x time interaction). LDL cholesterol, HDL cholesterol, fasting glucose, lean mass, and visceral fat mass were not significantly different from the control group after 12 weeks (no group x time interaction). Conclusions: These findings suggest that 8-h time restricted feeding produces mild caloric restriction and weight loss, without calorie counting. It may also offer clinical benefits by reducing blood pressure.

86. Gama Mendoza, Cecilia

**Spanish for Heritage Speakers: The need for courses, funding, and professional training**

*Undergraduate - Spanish*

The role Spanish for native speakers (SNS) instruction in a non-native educational curriculum is critical for the advancement of native speakers in a non-native system. This research focuses on the case of Illinois in which Spanish for Heritage speakers programs are present, but they do not provide a similar model for expansion in the student’s learning as native speakers programs do. This proposal derives from a political and social justice perspective, and the need of Spanish education programs that promote the need of a culturally accurate education that is representative of their background. My findings evaluate the validity of the case of promoting SNS programs, funding, and the necessity of educator training.

87. Gao, Angela; Maizels, Evelyn; Brennan, Kevin and Young, Christine

**Comparing the Effectiveness and Engagement of Comics to 3D Animation in Teaching Advancements in Nanomedicine**
Graduate / Professional - Biomedical and Health Information Sciences

Communication of new findings between scientists and medical professionals is essential for discoveries to translate into therapies, especially in the emerging field of nanomedicine. Understanding of mechanisms on the cellular and molecular scale is facilitated through the use of visualizations, such as 3D animation. This project seeks to validate the knowledge transfer of complex biomedical information in nanomedicine using the comic book format, which has been effective for science communication but untested in medical education. A comic book about how a synthetic high-density lipoprotein gold nanoparticle may be used as a potential therapy for lymphoma was created and compared to a 3D animation with identical content. This project will explore how these visualization formats – comic vs. 3D animation – differ in terms of knowledge gain, engagement, and preference in order to determine the viability of comics in enhancing communication of nanomedical discoveries to medical students.

88. Gao, Yan; Huang, Bidan and Goteti, Venkata Sasikiran

Optimal Dose Designs in Dose-finding Clinical Trials

Graduate / Professional - Division of Epidemiology and Biostatistics

The choice of doses for including in dose-finding clinical trials is critical in order to characterize the efficacy and safety profiles of a compound. Dose(s) too high could result in an unacceptable toxicity, while dose(s) too low could miss detecting the true efficacy of a potentially efficacious drug. Both the full range of doses included in phase 2b dose-ranging clinical trials and the number of doses included are critically import. The primary objective of this project was to identify an optimal design in order to achieve the most accurate minimum effective dose (MED) while keeping the sample size at an appropriate number. Sample size and statistical power were calculated for MCP-MOD which is a statistical approach for the design and analysis of dose-finding trials that assesses different dose-response models. MCP-MOD protects the false discovery rate for the number of models included in the assessment. MCP-Mod allows consideration of several common parametric models as candidates to represent the true unknown dose-response curve, such as Linear, log linear, Quadratic, Emax, Logistic, Exponential and SigEmax. Simulations were conducted to assess dose designs by comparing bias and efficiency. Several findings from the simulations are: a) Different dose designs could result in the same total sample size and power; b) Including more candidate models resulted in increased total sample size; c) The number of dose arms and the dosage for each arm resulted in very different estimates of the MED for a given fixed total sample size. In conclusion, including 3 to 5 dose arms and considering 3 to 5 candidate models together provided dose designs with good properties including good estimation of MED in most scenarios.

89. Garay, Carlos

White Normativity & Its Correlation with Juvenile Justice
Throughout the recent years, we have seen an uprising in violent and drug related crimes that target juvenile youth. Many studies have undergone investigations in order to emphasize various relationships that imply different outcomes for juvenile youth such as race being a primary component. Research that focuses on violent and drug related crimes are being used in order to compare sentencing outcomes between youth of color compared to white juvenile youth. For this independent research project, I'll be researching the relationship white-normativity has in regard to juvenile court cases. White-Normativity for this project is defined as a societal perception of innocence and non-deviant behavior embedded within the white culture. White-Normativity has normalized various sentencing outcomes and has provided leniency and favoritism towards white youth regardless of conscious and unconscious awareness. To emphasize the argument at hand, I have gathered a collection of 90 various online news publications that focus on juvenile youth on trial for murder and rape charges. News publications originate from major publications such as Fox, CNN as well as non-popular news publications. The collection of articles will then be imported into the analytical program Dedoose to be analyzed and coded critically to compare how various news outlets post about white juvenile youth in comparison to youth of color. Outcomes from this project will help determine the relationship white-normativity has in correlation towards white youth on trial for murder and rape charges. The conclusion of the thesis will provide beneficial information in hopes of providing results behind the relationship racial background has towards juvenile youth. White juvenile youth are being analyzed critically in favor to further elaborate and provide data behind white-normativity and its correlation to juvenile justice cases.

Effects of Political Orientation on Reactions Toward Animal Abuse

Animal abuse is becoming recognized as a serious offense in the United States, with many states passing related legislation and the FBI beginning to track cases through the Uniform Crime Report. This study is timely, as there is little research on animal abuse in general, and there have been no studies examining whether political orientation affects reactions to animal abuse. Using data from a larger study, I explored the relation between political orientation and reactions to abuse. I conducted a 2(Victim type: human vs. animal) x 2(Political orientation: liberal vs. conservative) mixed ANOVA on punishment ratings, with political orientation varied between-subjects and victim varied within-subjects. Consistent with my first hypothesis, I found that, overall, people were more punitive toward human than animal abuse. I also hypothesized a significant two-way interaction between victim type and political orientation, such that liberals would be more punitive toward animal abuse than conservatives, and that conservatives would be more punitive toward human abuse than would liberals. I did not find support for this hypothesis – instead, participants were more punitive toward human vs. animal abuse regardless of political orientation. I also hypothesized that compared to conservatives, liberals would react
more negatively to scenarios of animal abuse; however, I did not find support for this hypothesis, although the pattern of means trended in the predicted direction. Political orientation has a slight, but non-significant effect, such that conservatives tended to be more punitive toward human and animal abuse. Political orientation also did not affect emotional reactions toward animal abuse.

91. Gawrys, Paige

**What It Would Take to Turn a Sweatshop Into an Ethically Operating Factory: A Proposal for Foxconn**

*Undergraduate - Business Administration*

This presentation and paper will be a case analysis of Foxconn's notoriously unethical operation. Foxconn is an electronics manufacturer in China that manufactures 40% of the world's electronics and employs 1,300,000 workers. Foxconn's largest factory compound is located in Shenzen, China and employs 300,000 workers. This compound is also notorious for its unethical treatment of its workforce, citing a significant number of worker suicides due to living and working conditions within the complex among many other ethical violations. This paper will look into the indignities of Foxconn, and focus on what could be done to minimize ethical violations. This paper would use benchmark measures from more ethical factories to set new standards of Foxconn. It would also make Foxconn owners adhere to the basic human living and working standards as outlined in the Universal Declaration of Human Rights, which China has signed.

92. Gebre, Eden; Nepomuceno, Vanessa M. Burdette, Joanna E. and Murphy, Brian T.

**Discovery of Microbial Small Molecule Drug Leads for the Treatment of Ovarian Cancer**

*Undergraduate - Liberal Arts and Sciences*

Ovarian cancer accounts for approximately 3% of cancers among women but causes more death than any other cancer of the female reproductive system. Ovarian cancer is a deadly disease because it is hard to diagnose due to it unclear symptoms like bloating, back pain and other common symptoms of diseases. The research focuses on high grade serous Ovarian Cancer (HGSOC) that may arise from the fallopian tube or ovarian surface. It accounts for 75% of all ovarian carcinomas and 90% of deaths are from this subtype which often relapse with aggressive, treatment-resistant cancer. Therefore, the discovery of new drug leads for Ovarian Cancer is imperative. A high number of anticancer compounds are natural products and/or their derivatives mainly produced by microorganisms like bacteria. Nearly 23,000 bioactive secondary metabolites produced by microorganisms have been reported in literature. Over 10,000 of these reported compounds are produced by Actinomycetes. Actinomycetes belong to the phylum Actinobacteria, a well-documented source of bioactive molecules. The Murphy lab focuses on secondary metabolites produced by aquatic Actinomycetes as a source for new drug leads. We hypothesized that aquatic microorganisms produce metabolites that are cytotoxic toward high
grade serous ovarian cancer cells and that we can use as anticancer leads. In the current study, five Actinomycete strains are investigated for potential bioactive metabolites.

93. Geevarghese, Elizabeth and Fung, Leslie  

**Circular Dichroism Studies of Human Brain Alpha and Beta Spectrin Association for Functional Spectrin Tetramers**  
*Undergraduate - Chemistry*

Spectrin is a (cyto)skeletal protein that is located in the plasma membrane of eukaryotic cells. It acts as the “scaffolding” of the plasma membrane and spectrin is vital for (cyto)skeletal structural integrity. The functional form of spectrin is a tetramer. Human brain alpha and beta spectrin undergo coiled coil association at the tetramerization site to form ()2 tetramer. At the tetramerization site, two spectrin dimer complexes interact in a “head-to-head” manner (Hill et al., 2013). Each spectrin dimer consists of an - and a -subunit. The partial domain of the spectrin, which consists of one helical segment at the N-terminus, is thought to associate with the partial domain of the spectrin, which consists of two helical segments at the C-terminus (Luo et al., 2002). The association between the -partial domain and -partial domain was monitored with far-UV (200-250 nm) circular dichroism spectroscopy (Mehboob et al., 2001). For this project, it was proposed that near-UV (250-350 nm) circular dichroism could be used to monitor and study the tertiary structural changes in tetramer formation. This region is the aromatic absorption region used to monitor the tertiary structure (Correa and Ramos, 2008). We utilized αII 1-147 and βI 1898-2083 in a PBS buffer at pH 7.4 as model proteins for α and β spectrin. These were monitored with near-UV circular dichroism before and after tetramer formation. The CD signals obtained were deconvoluted to give the signals from mostly the tryptophan residues in the partial domain of spectrin. I will show the differences of CD signal in the partial domain of spectrin before and after association, to demonstrate that near-UV (250-350 nm) circular dichroism CAN be used to monitor tertiary structure changes in the tetramerization of spectrin.

94. Ghazawi, Tariq  

**Reliability and Validity of Procedural Memory Tasks**  
*Undergraduate - Biological Sciences and Psychology*

Long-term memory is a type of memory that lasts from days to years. Stored information in this realm of memory include declarative and non-declarative memory, in which the former is consciously accessed while the latter cannot be consciously accessed. Early cases of patients with amnesia gave insights into the distinct types of long-term memory systems and their underlying biological mechanisms. The focus of this paper will be on a sub-type of non-declarative memory called procedural memory. An intact procedural memory is critical for sub-consciously performing everyday tasks, such as driving, using tools, riding a bike, etc… Likewise, it is very important to have valid tasks that can measure the underlying procedural...
memory reliably and accurately. Therefore, the hypothesis is whether or not the several procedural memory tasks carry reliability and validity in measuring procedural memory. There were 20 participants (7 males and 13 females between ages 18 to 21). Each participant completed five tasks in a single study session, which included 3 procedural memory tasks and 2 declarative memory tasks. The procedural memory tasks include Weather Prediction Task, Serial Reaction Time, and Tower of London. Declarative memory tasks include Continuous Visual Memory Task and Modern Language Aptitude Test Part V. Results indicate that procedural memory tasks carry discriminant validity but lacks convergent validity. These results suggest that performance on one procedural memory task does not correlate with performance on another procedural memory task. Moreover, performance on these tasks may reflect a complex combination of different types of memory. Implications for future research on the convergent validity of procedural memory tasks should be considered.

95. Giannakopoulos, Konstadena

**Enhanced Testing Effect Through Fewer Testing Constraints**

*Undergraduate - Psychology*

Previous research shows enhanced memory for previously learned materials that are repeatedly tested compared to re-studied, known as the testing effect. However, less research has been done to understand the conditions that produce the strongest testing effect. One way to influence the magnitude of the testing effect is by manipulating how participants access previously learned information during the intervening test. For example, one possible manipulation is to vary the amount of information (test constraints) given to aid retrieval during an intervening test. Prior work for a related memory phenomenon, the generation effect, has shown that giving less information about the to-be-generated item (fewer constraints) leads to greater memory benefits, compared to more information. In the present study, we investigated whether fewer constraints during the intervening test would similarly improve the memory benefits from testing. Participants initially learned a set of word pairs. Then in an immediate intervening test, these same word pairs were presented in either a lower-constraint (brief-__), higher-constraint (open-lsoce) or re-study (blaze-fire) condition. After a two-day delay, participants returned for a final cued-recall test. Our results supported the standard testing effect, where tested word pairs were better remembered than those re-studied. Importantly, however, we found improved memory for items in the lower-constraint over higher-constraint and restudy conditions. Thus, these results suggest that an intervening test with fewer testing constraints amplifies the testing effect. Understanding the conditions which lead to the enhanced memory, such as fewer testing constraints, can help maximize the potential benefits of effective learning strategies.

96. Gomez, Stephanie; Marques, Isabela and Marquez, David

**Feasibility of a Mobile Health-Infused Dance Program for Middle-Aged and Older Latinos**


Undergraduate - Kinesiology and Nutrition

Older Latinos have low levels of physical activity (PA). Dance is a culturally appropriate form of PA to address risk of chronic diseases. Also, technology ownership is increasing among older Latinos; therefore, mobile health could be an appropriate strategy to promote PA among this population. The purpose of this study was to assess the feasibility of a mobile health-infused dance program for middle-aged and older Latinos. A single group pre- post feasibility trial was conducted for 16 weeks. Mobile health components (wearable, mobile application, and text messages) were added to the BAILAMOS© dance program. Classes were held twice a week for two hours each session. The first 30 minutes were devoted to a technology class, followed by one hour of the BAILAMOS© Latin dance program, and an extra 30 minutes of technology practice. Participants wore a wearable fitness tracker for 18 weeks (16 weeks of the program + baseline and post testing weeks) and received text messages for 12 weeks (last 12 weeks because many participants needed training in reading messages). Feasibility was assessed by recruitment capability; acceptability and suitability; and resources requirements. Recruitment was conducted for eight weeks. The main recruitment strategies were announcements at the host senior center, and having the study announcement printed in Catholic churches’ weekly bulletins. Fifty-eight middle-aged and older Latinos who owned a smartphone were assessed for eligibility, and 20 participants (34%) started the intervention (female n=15, M age = 67). Twenty participants (100%) wore the wearable for the 18 weeks, and 17 participants (85%) completed the dance program. In debriefing sessions, participants reported great enjoyment of the program and stated that it was too short. Costs for the intervention was $9572 (dance instructor, Fitbits, text messages, participant compensation, data collector). Thus, a mobile health-infused dance program appears feasible for middle-aged and older Latinos.

97. Gonzalez, David; Nepomuceno, Emily; Lee, Sue; Ben Aissa, Manel and Thatcher, Gregory R.J.

Understanding the Adverse Effects of Possessing Multiple Comorbidities for the Future of Drug Discovery: Development of a Novel “2 Hit” Preclinical Mouse Model

Undergraduate - Medicinal Chemistry and Pharmacognosy

As advances in healthcare cause life expectancy to rise, the population has paradoxically been observed to possess greater probabilities to develop one or multiple chronic conditions. The percentage of people with a comorbidity (two chronic diseases/conditions) has been increasing since the early 2000’s. As a result, a strong positive correlation exists between the rise in chronic conditions and increases in spending for both individuals and the US. These trends indicate a need for new insights on the interaction that one chronic condition may have on another for the purpose of improving treatment and drug therapy. A literature analysis on these trends has been done looking at how exacerbated effects associated with comorbidities demonstrate their importance for the future of drug development. A novel preclinical mouse model has also been developed giving us the capability to study comorbidities that focus on the interaction that one chronic condition (“second hit”) may have on preexisting oxidative stress (“first hit”). We hypothesize that our model (Aldh2-/-) will illustrate exacerbated damage when exposed to a
“second hit” supporting the detrimental effects of multiple comorbidities and the need for new insights on approaches to future treatments/drug developments. Specifically, the “second hit” has taken the form of traumatic brain injury, application of a high-fat diet, or the use of streptozotocin (diabetogenic). In each application of the “second hit”, cognition has been measured behaviorally using Novel Object Recognition and Y-Maze. Our results support the idea that comorbidities escalate health issues and should thus be more of a focus for evolving patient care. Through literature and the research conducted, the topic of comorbidities is becoming increasingly relevant when it comes to patient treatment. Further research into the topic with the utilization of models like ours may aid in providing more efficient and cost-effective care for patients.

98. Gonzalez, Rachel; Palter, Joseph; Chhabra, Neeraj and Rizvanolli, Lum

The Implementation of an Asthma Action Plan to Promote Self-Management and Improved Knowledge in Low-Acuity Asthmatic Adults Presenting to an Urban Emergency Department

Undergraduate - Integrated Health Studies

Asthma is a disease of the lungs where the airways become inflamed and narrowed, making it dangerously difficult for a person to breathe. It is a serious, chronic illness that affects nearly 25 million Americans, with about half of those experiencing a yearly exacerbation. This results in 1.75 million yearly emergency department (ED) visits, of which 25% receive admission to the hospital. Of those yearly emergency visits, two thirds consist of patients that are underprivileged and without insurance. In this study, a Quality Improvement measure for the ED at John H. Stroger Hospital, a public urban hospital in the city of Chicago that provides care to a largely underserved and uninsured population, was combined with a research study that used the traditional four step Kirkpatrick model to assess the educational success of the intervention. The overall objective was to improve patients’ asthma self-management skills in order to decrease the amount of times they must go to the ED for an asthma-related complication. The measured outcomes were (1) the patient’s baseline knowledge regarding asthma (2) the patient’s response and commitment to utilize the knowledge from the AAP, (3) the patient’s long term implementation of this knowledge to reduce the need for ED visits, and (4) the change in the number of exacerbations which led the patient to the ED following the intervention. The results indicated success of the intervention among participants (N=33), with a 17.3% (P=0.001) average improvement in asthma knowledge, 78.8% reporting a positive response to the educational intervention and 87.9% reporting a commitment to utilize the knowledge to better self-manage their asthma, and a statistically significant reduction in the number of ED visits by an average of 0.68 (P=0.0443) visits per six months.

99. Gorak, Karis; Prins, Gail; Majumdar, Shyama and Hu, Wen-yang

Epidermal Growth Factor Signaling in Human Prostate Stem-Progenitor Cells
Prostate cancer is the most common noncutaneous cancer and the second leading cause of cancer deaths in North American men. It is well recognized that androgens play an important role in prostate carcinogenesis and progression; however, new evidence suggests that estrogens play fundamental roles in initiation, promotion, and progression of prostate cancer. Studies have shown that prostate cancer cells can develop in a hormonal-refractory state which may be due to upregulation of growth factor and receptor signaling pathways, one of which is the epidermal growth factor receptor (EGFR). Additional research has demonstrated that EGFR expression increases during the natural history of prostate cancer. The present study investigated the role of EGFR in prostate stem and progenitor cell proliferation, dissected downstream signaling pathways that are activated via estrogen mediated phosphorylation of EGFR, and investigated which specific subtype of estrogen receptor, ERα or ERβ, mediates cross talk through EGFR. Primary human prostate epithelial cells (PrECs) and Human stem-like cells (HuSLCs) were cultured and exposed for 30 minutes to either 10 nM E2 (estradiol) or vehicle (ethanol). Subsequently, trials of siRNA transfection, RNA extraction, and qPCR were conducted on PrECs. Additionally, Western Blotting procedures and rounds of antibody exposure were performed on both HuSLCs and PrECs. Results demonstrated that EGFR is expressed in both PrECs from healthy organ donors, and in the cancerous HuSLC cell line. Activation of downstream signaling pathways, including the AKT and ERK phosphorylation cascades, were observed in cells exposed to Epidermal Growth Factor (EGF). Furthermore, cross talk between EGFR and ERβ was not detected, indicating the need for future studies to examine the relationship between EGFR and ERα. The significance of these studies comes from new knowledge on the specific contributions that EGFR makes to prostate cancer progression from the stand point of estrogen mediated stem cell signaling.

100. Grand Pre, Tyler

The Time Machine to 1984: The Politics of Space and Language in Dystopia

I examine the politics of utopian and dystopian narratives from the late nineteenth century to the middle of the twentieth. Utopian theorists see this period of utopian discourse as impactful to the birth of dystopia, and I try to further the discussion through a close analysis of dystopian characterizations of space. At the heart of my research is Foucault’s famous concept of heterotopia, which is essentially an isolated variation, or inversion, of the spatial and socio-political systems of the society in which it appears. I am also primarily concerned with a motif that appears in several dystopian novels including H.G. Wells The Time Machine and George Orwell’s 1984: the protagonist engaging in a kind of centrifugal, utopian wandering that leads him or her away from a socio-politically hegemonic center or city to heterotopian sites on its periphery that contest, invert, and deconstruct its philosophies and ideologies. I see this perambulatory and spatial motif as an almost complete denotative collapse of the term topos (the physical space, the discursive or topical space, and the linguistic space) that is at the heart of
Utopia and its neologistic tradition. Figures like the Time Traveler or Winston wander their physical, psychological, and linguistic terrains in a kind of deconstructive search for what Anna Kornbluh in her essay “The Realist Blueprint” calls “a rend in the fabric, a rupture in reality” that “mediate[s] openings to what inexist[s],” to utopia, and, as can be seen in such works, even to dystopia (201-2, 204). Heterotopia, therefore, seems to occupy the generic interstices of Utopia and Dystopia, and I would like to further explore what relation it has to walking, writing, and speaking as utopian acts that may, in turn, contribute to the generic collapse of Utopia and the rise of Dystopia.

101. Green, Nicole and Engel, Kathryn

**Exploratory Analysis of Engagement in a Large Multinational Corporation**

*Undergraduate - Psychology*

In the current modern era, corporations have shifted their optimization focus to include a mutual beneficial relationship between employer and employee in the form of employee engagement (Masson, Royal, Agnew, & Fine, 2008). Employee engagement within an organization serves the best interests of the business and its workers by gaining profits, retaining employees and creating a better work environment for those employees and the customers they serve (Macey, Schneider, Barbera, & Young, 2011, Holbeche & Geoffrey Matthews, 2012, Jones, Ni, & Wilson, 2009, Musgrove, E. Ellinger, & D. Ellinger, 2014). Employee engagement can be defined as a work-related state of mind that is positive, fulfilling and is characterized by vigor, dedication and absorption, that goes beyond job satisfaction (Schaufeli, Salanova, González-romá, & Bakker, 2002, Macey, Schneider, Barbera, & Young, 2011). By understanding the relationship between engagement and its components in an applied setting, potential patterns to effectively drive and improve these elements in future practices can be identified. The goal of this analysis will be to identify patterns within the internal data that point to significant factors on engagement. These patterns will inform corporate trainers and managers responsible for driving increased engagement with the goal of improving work place relations for employees and employers.

102. Griza, Ruxandra

**Water with Purpose: The Status of Aquaponics and Sustainable Urban Agriculture**

*Undergraduate - Earth and Environmental Sciences*

Current agriculture and aquaculture practices are unsustainable, damaging the environment while exploiting precious land and water resources. Despite this, healthy food is not a guarantee for many people, whether in developing nations or developed urban areas. As the impact of climate change grows on the agriculture industry, food production methods will need to adapt in order to ensure enough food is available even as land and water resources grow more scarce. One such method, called aquaponics, couples the growth of plants and fish, connecting the two organisms by cycling the same water between them based on the premise that the waste product of one
organism serves as a nutrient source for the other. This means that aquaponics has the potential to optimize resources and decrease negative environmental impact of food production, making the technology highly sustainable. However, while aquaponics seems promising in theory, its application will be affected by economic, behavioral, political, and cultural factors. In addition, this research identifies aquaponics operations in the city of Chicago, which are included in a case study representing the aquaponics community of Chicago. The case study analysis serves to conceptualize the opportunities and challenges for greater deployment of aquaponics in the Chicago area. Based on these findings, a set of recommendations will be formulated to inform how aquaponics can better be applied in urban areas.

103. Gross, Nicholas

**Geometry and Structure of BaTiO3 Nanocubes**

*Undergraduate - Physics*

Transition metal oxides, such as BaTiO3, exhibit a wide range of properties including ferromagnetism, ferroelectricity or superconductivity. More specifically, BaTiO3 is a prominent member of the class of ferro-electric oxides, which have a spontaneous electric polarization that can be reversed by the application of an external electric field. The goal of my research is to characterize the geometry of BaTiO3 nanocubes and correlate the nanocubes’ size and shape with the previously measured ferro-electric polarization properties. In fact, it was found that nanocubes that are nominally 45 nm in diameter have a ferroelectric transition temperature that is significantly higher than bulk BaTiO3. It is my goal to examine whether 1) the nanocubes are single-crystal, 2) the 45 nm nanocubes exhibit unusual surface termination and 3) the lattice constant of the BaTiO3 nanocubes depends on the particle size. In order to accomplish this, I will be using the various powder samples provided to us by our collaborators at Central Michigan University and preparing them for transmission electron microscopy analysis using a mesh copper grid with either a graphite or carbon coating. Using the JEOL-JEM 3010 Transmission Electron Microscope (TEM), I will be able to characterize the samples under atomic-resolution and examine the local crystal structure, as well as the overall morphology of the cubes. I will also be using the electron energy-dispersive X-ray spectroscopy (XEDS) in the TEM to determine what elements are found inside the nanocubes and characterize the elements on the nanocube’s surfaces. It is my hypothesis that the size, crystal structure and surface terminations of the 45 nm large cubes is just right to provide the right conditions for a significant increase in the transition temperature.

104. Guidarini, Adam

**The Diary of Antonio Galli: A New Perspective on the Second World War**

*Undergraduate - Hispanic and Italian Studies*

Over the course of the past two years I have been translating Pievepelago Durante la Seconda Guerra Mondiale by Antonio Galli from Italian to English. The translation was originally started
by my grandfather Dino Guidarini who passed away in 2012 and never finished it. In 1943, the parish priest of Sant’Andrea Pelago Antonio Galli began recording his perspective of what was happening around him after the armistice between the Allies and Italy was signed. Throughout the diary Galli shows us the way that the Germans soldiers acted in the area, at times showing them as relatable, brave, and dignified and at others examples of the horrendous acts of violence that were carried out against the civilian population during the war. He also shows his personal interactions with the soldiers, many of whom were from countries other than German and had been conscripted into the army. In addition to these Galli also shows brave acts of defiance in the face of impossible odds on the part of the civilians and a few of those who forced to fight for Germany.

105. Guidetti, Martina

Anisotropic Composite Material Phantom to Improve Skeletal Muscle Characterization Using Magnetic Resonance Elastography

Graduate / Professional - Bioengineering

The presence and progression of neuromuscular pathology, including spasticity, muscular dystrophy, hyperthyroidism, paraplegia, atrophy and myositis has been correlated with changes in the intrinsic mechanical properties of skeletal muscle tissue. Improved means of noninvasively measuring and monitoring these intrinsic properties could benefit basic research into understanding neuromuscular pathology, as well as translational research to develop therapies, by providing a means of assessing and tracking their efficacy. Dynamic elastography methods for noninvasive measurement of tissue mechanical properties have been under development for nearly three decades. Much of the technological development to date, for both ultrasound (US)-based and magnetic resonance imaging (MRI)-based strategies, has been based on assumptions of local homogeneity and isotropy. Skeletal muscle is anisotropic and fibrous; as one seeks to improve the accuracy and resolution in mechanical property assessment, heterogeneity and anisotropy need to be accounted for in order to optimize both the dynamic elastography experimental protocol and the interpretation of the measurements. Advances in elastography methodology at every step have been aided by mechanical phantoms that approximate the target tissue. The aim of the present study was to develop and characterize a heterogeneous composite phantom design that has uniform controllable anisotropic properties comparable to the frequency-dependent anisotropic properties of skeletal muscle. Experimental MR elastography (MRE) and computational finite element (FE) studies are conducted on a novel 3D printed composite phantom design. The displacement maps obtained from simulation and experiment show the same elliptical shaped wavefronts elongated in the plane where the structure presents higher shear modulus. The model exhibits a level of anisotropy in line with literature data from skeletal muscle tissue MRE experiments. FE simulations of the MRE experiments provide insight into proper interpretation of experimental measurements and help to quantify the importance of heterogeneity in the anisotropic material at different scales.
Phytochemical Investigation of West African Ethnomedicinal Tuber Icacina trichantha

Graduate / Professional - Medicinal Chemistry and Pharmacognosy

Icacina trichantha Oliv. (Icacinaceae) is a plant endemic to Nigeria and other regions of western Africa that has traditionally been used to treat food poisoning, constipation, and malaria. The purpose of this research is to conduct the first phytochemical analysis of this species to determine its therapeutic potential. Bioassay-guided fractionation was used to guide the isolation of bioactive compounds by chromatography and HPLC techniques. The chemical structures were then elucidated with NMR and MS analysis. Our work has led to the enrichment of known compounds such as humirianthol and icacinol, reported to have favorable herbicidal traits. We have also identified several novel compounds primarily from the pimarane diterpene class, some of which have demonstrated moderate cytotoxic activity. Further investigation of the diterpenes from Icacina trichantha is warranted due to their unique chemical diversity and biological activity.

Ethanol as a reliable source of clean energy

Undergraduate - Economics

The need to go towards cleaner and renewable sources of energy is increasing day by day. The over dependence on fossil fuels has resulted in an anthropological carbon footprint bigger than ever, leading various adverse climate change related issues. Over the past 2 decades, the biofuel industry resulting from the conversion of ethanol into usable fuel, supported by the massive agricultural sector of the United States of America, has been growing and becoming an extremely viable source of cleaner energy. The paper explains the various processes of turning ethanol into fuel and then compares the consumption and production of ethanol with other renewables, showing how ethanol has grown into one of the largest source of alternative energy over the past 10 years. Ethanol production and consumption levels are then analyzed in order to identify growth trends in the industry. In order to show that ethanol is environmentally friendlier, carbon emission levels of biofuel and fossil fuels are compared. The paper concludes with the analysis of ethanol production and consumption in the state of Illinois.

Dehydration and Fragmentation of 5-Hydroxyalkyl-1H-tetrazoles into Alkynes

Undergraduate - Chemistry
Benefits of tetrazole are widely known in the Pharmaceutical industry, a compound with tetrazole groups are more lipophilicity than carboxylic acid which helps in digesting drugs. Its properties allow slower metabolic degradation and longer half-lives. Tetrazole has a potential precursor for alkylidenecarbene which are highly electron deficient and can go under a synthetic reaction to form alkynes. In 1996 Behringer and Martner reported various 5-methyl-1H-tetrazole that provided both internal and terminal alkynes, however, the downside of the reaction was high temperature such as 150°C were required. However in 2012 Wardrop and Komenda reported upon treatment with stoichiometric quantities of carbodiimides, 5-hydroxyalkyl-1H-tetrazole undergo a sequence of dehydration and fragmentation to generate alkynes arising from the 1,2-rearrangement of a carbine intermediate under mild condition. Currently, the research proceeds to find Lewis acids that catalyze Fritsch-Buttenberg-Wiechell (FBW) rearrangement in mild condition and high yields.

109. Gurtatta, Rajangad; Macherla, Vasundhara; Krishnan, Harish; Zhang, Huaibo and Pandey, Subhash

Alterations in amygdaloid NPTX2 gene expression following acute and chronic ethanol exposure in rats

Undergraduate - Psychiatry

Long-term ethanol exposure and subsequent withdrawal affect synaptic remodeling in the amygdala which is associated with the development of withdrawal symptoms. Higher expression of neuronal pentraxin II (NPTX2) has been implicated in the pathophysiology of neurodegenerative diseases. As ethanol exposure leads to neuronal damage, we investigated the regulation of NPTX2 gene expression in the amygdala during acute and chronic ethanol exposure in adult male Sprague-Dawley rats. We utilized quantitative real-time polymerase chain reaction (qPCR) to measure mRNA expression of NPTX2. For acute treatments, rats received a single 1g/kg intraperitoneal injection and one hour later brain amygdaloid structures were collected. In the chronic treatment paradigm, rats were given the Leiber-DeCarli control or ethanol (9%/v) diet for 15 days and then subjected to a 0 or 24 hour withdrawal period and their amygdaloid tissues were collected. Total RNA was isolated from amygdala samples, reverse transcribed, and then underwent qPCR to measure gene expression. There was a significant upregulation of NPTX2 mRNA during acute ethanol exposure. However, chronic ethanol exposure produced no change when ethanol was on board (0 hr withdrawal group). Interestingly, during withdrawal (24 hr group) following chronic ethanol exposure, there was a significant upregulation in NPTX2 mRNA levels. These findings suggest that acute ethanol (1g/kg) may prime the brain for neurodegenerative changes due to higher levels of NPTX2 in the amygdala, that persist during withdrawal from chronic ethanol exposure. This may be an important mechanism underlying synaptic remodeling in the brain of alcoholics (Supported by grants from NIH-NIAAA and department of veterans affairs to SCP).
Perceived Sources and Types of Social Support by Older Latino Caregivers

Undergraduate - Kinesiology and Nutrition

Over 15 million Americans are caregivers to people with Alzheimer’s disease and related dementia (ADRD). Ethnic and racial minorities utilize more informal caregiving services than Whites, with older Latinos being less likely to use institutional and community based long-term care. This study aimed to identify the perceived social support received by unpaid, older, Latino, primary caregivers of a loved one with ADRD. Participants in the study were 16 caregivers (12 females, 4 males) with a mean age of 60 years (SD = 8.5), self-reported Latinos, and caring for a loved one with ADRD for a minimum of 4 hours per day for the last 6 months. Interviews followed a semi-structured interview guide to explore and understand the Latino caregiver experience by examining the caregiver and care recipient relationship, sources of social support and support influence on caregiver behavior. A direct content analysis was conducted identifying existing research and key concepts. The social support sources identified were: (a) family, (b) organizations, (c) friends, (d) government, (e) therapist, and (f) paid aid. These sources provided emotional support through moral support, instrumental support such as rent money, informational support as advice and information on the role of caregiving, and appraisal support through constructive feedback. Family provided emotional, instrumental, informational, and appraisal support. Organizations also provided those, excluding emotional support. Friends provided emotional and instrumental support, and government and paid aides each provided instrumental support. Therapists only provided appraisal support. Caregivers seemed to sacrifice their own health to provide care to the loved one, and lack of emotional and appraisal support was evidenced. There is a need for development of more resources offering different types of social support for Latino caregivers. Future studies should promote programs aiming to provide tools and strategies to increase social support for older Latino caregivers.

Can Education Change Environmental Values? Assessing Values Held Regarding the Chicago River

Undergraduate - Psychology

There is a clear disconnect between the general public’s and the scientific community’s value and understanding of the environment – the public is not aware of the significance of environmental health and the environment’s impact on their well-being, whereas those in the scientific community are (Lindland & Volmert, 2017). The public struggles to place real value in the environment and therefore struggles to find a reason to care for the environment’s protection. This project reports the results of two studies on environmental attitudes. In the first study, 50 people were questioned about their opinions regarding The Thames in London, England. They were selected randomly as they walked along the river. Completing a survey about the River Thames changed public appreciation for the river. The second study will test the hypothesis that
the survey helped to educate the public about the river, and this is why their attitudes changed. This hypothesis is consistent with prior work showing that informing people about an issue (through a short quiz or survey questions) can help to change their attitudes on climate change (Ranney & Clark, 2016). The second study is currently underway. In this study, people from Chicago will participate in a survey assessing the values they place on the Chicago River. Participants either read an informational text regarding the river before taking the survey or read an unrelated text. The amount of value participants place in the river will be compared across conditions, with the prediction that those who read the informational text will place more value in the river. Making the public aware of the value of the environment, and discovering effective outreach methods, is a first step toward getting the public involved in a true and effective movement to remedy climate change.

112. Haider, Amna; Oddo, Danielle and Cordoba-Chacon, Jose

Hepatocyte PPARγ plays a significant role in the development of non-alcoholic steatohepatitis induced by methionine and choline deficient diets.

Undergraduate - Endocrinology, Diabetes and Metabolism

Non-alcoholic steatohepatitis (NASH) is an advance state of liver disease characterized by the deposition of collagen (fibrosis), inflammation, hepatocyte ballooning and apoptosis. The pharmacological activation of the nuclear receptor peroxisome proliferator-activated receptor gamma (PPARγ) has beneficial effects in the treatment of NASH. However, hepatic PPARγ expression is positively associated with the development of NASH in mice and humans. To test if hepatocyte-specific PPARγ plays a role in the development of NASH in mice, we have knocked-out PPARγ in hepatocytes of adult mice. Briefly, 10 week-old PPARγ-floxed mice were treated with a single injection of adeno-associated virus (AAV) that express Cre recombinase in hepatocytes to generate adult-onset hepatocyte-specific PPARγ knockout mice (aHepPPARγKO). PPARγ−floxed mice treated with a null AAV served as controls. Two-weeks after AAV treatments, half of the control and aHepPPARγKO mice were fed a methionine- and choline-deficient diet (MCD) for three weeks to induce NASH, while the rest of the mice were fed to a methionine- and choline-supplemented diet (MSD, no NASH). Independently of PPARγ expression, MCD-fed mice showed reduced body weight, fat mass and increased plasma alanine aminotransferase (ALT) levels as compared with MSD-fed mice. Liver weight was similar between MSD- and MCD-fed mice, however, MCD-fed mice showed increased hepatic fat content. Hepatic expression of genes related with NASH: collagen 1α1, α-smooth muscle actin, tumor growth factor 1β, tumor necrosis factor α, and the macrophage marker (F4/80) were increased in MCD-fed control mice as compared to MSD-fed mice. Interestingly, MCD-fed aHepPPARγKO showed reduced expression of these genes, and reduced collagen staining (picrosirius red/fast green stained liver sections) as compared to MCD-fed controls. Taken together, these data suggest that hepatocyte PPARγ expression may contribute to the progression of NASH (inflammation and fibrosis) without preventing liver injury (ALT levels) or steatosis in MCD-fed mice.
113. **Haider, Shahzaib; Zhang, Min; Tang, Haiyang and Chen, Jiwang**

**Conditional Brg1 Deficiency in Smooth Muscle Cells or Endothelial Cells Protects Against Hypoxia-mediated Pulmonary Hypertension in Mice**

*Undergraduate - Liberal Arts and Sciences*

Brg1 (Brahma related gene 1) is part of the large ATP-dependent chromatin remodeling complex SWI/SNF. Recently scientists reported that Brg1 expression is upregulated in pulmonary artery smooth muscle cells under hypoxia exposure. We hypothesize that Brg1 inhibition may protect hypoxia mediated pulmonary hypertension. Brg1 global knockout mice are lethal. In this study we first generated endothelial cell (EC) or smooth muscle cell (SMC) specific Brg1 deficient mice (Brg1floxfloxSclCre+ and BRG1floxfloxMHC Cre+). Using these tamoxifen inducible mice, we examined whether these Brg1 conditional knockout mice are protected from hypoxia-mediated pulmonary hypertension. Our data show that there is no significant difference between controls and these Brg1 conditional knockout mice. However under 4-week hypoxia (10% O2) exposure, either endothelial specific or smooth muscle specific Brg1 conditional knockout mice develop less pulmonary hypertension and pulmonary vascular remodeling, demonstrated by significantly lower right ventricular systolic pressure, lower right ventricular hypertrophy and lower pulmonary vessel medial layer thickness. In conclusion, Brg1 deficiency in smooth muscle cells or endothelial cells protects against pulmonary hypertension in mice.

114. **Haro, Bianca**

**Community Health Assessment of East Garfield Park**

*Undergraduate - Nursing*

Chicago is one of the most diverse and yet segregated cities in the United States. Within the city limits you will find neighborhoods that are completely different from one another especially when it comes to factors such as race, culture and wealth. While there are many communities that continue to thrive, there are neighborhoods that face many issues such as poverty, health disparities and homelessness. East Garfield Park as a brief overview contains a large adult male homelessness population, most of the members of the community live under the poverty line and their murder rate is three times higher then the Chicago average. Due to living in such a high stress environment many of these homeless adult males deal with many health issues, one being depression. The research presented focuses on conducting a community health assessment of East Garfield Park with a primary focus on the homeless adult male population and determining how the five determinant of health relate to their nursing diagnosis.

115. **Harris, Diamond; Zinsser, Katherine and Curby, Timothy**

**Early Childhood Professionals' Conceptualizations of Emotional Competence**

*Undergraduate - Psychology*
Emotional competence is the ability to express and regulate one’s emotions in a socially acceptable manner, as well as to recognize and acknowledge one’s own emotions and the emotions of others. Parents and teachers of preschool children have been found to play important roles in socializing these emotional behaviors through teaching, modeling, and contingent reactions. Despite the robust literature on emotion socialization, relatively little is known of early childhood administrators’ beliefs about and understanding of children’s emotional development, which may impact their investment in and support of social-emotional teaching practices in their programs. Early childhood professionals (N=43) provided both quantitative and qualitative data while attending a leadership convention. Quantitative analyses reveal wide variation in the perceived impact of different socialization partners (i.e. parents, peers, and teachers) and the relative importance of a social-emotional curriculum. Qualitative analyses will enhance our understanding of how administrators perceive and define competent and incompetent child behavior and will support professional development and program-level support efforts.

Keywords: emotional competence, preschool, emotion perceptions

Drosophila brain sampling method development for the analysis of histamine metabolization during the sleep-wake cycle

Histamine is involved in metabolic and neurological bodily functions that are often regulated by circadian rhythms. One of the functions of histamine is to promote wakefulness in a wide range of organisms. Histamine deficient mutant Drosophila have been shown to sleep for longer periods of time, and it is suggested that histamine promotes activity via neurons that express neuropeptide pigment dispersing factor. Yet there is a dearth of research examining the circadian context of histamine concentrations in the Drosophila brain. It is proposed that histamine production in the brain ebbs and flows throughout a 24-hour period to help regulate the sleep patterns of Drosophila, and a novel approach was developed to test this hypothesis. Sleep data was collected using a Drosophila Activity Monitoring (DAM) system—sleep being defined in blocks of fly inactivity lasting five minutes or more, detected by the system’s laser beams. Flies were removed from the system and sacrificed for brain dissections after one week of monitoring. Heads were removed using liquid nitrogen and a centrifuge, then freeze-dried in a lyophilizer for 30 minutes. Brains were dissected in an acetone bath, and brain tissue was homogenized using a microcentrifuge mortar and pestle. Samples were derivatized for 120 minutes with potassium cyanide and 3-(4-carboxybenzoyl)quinoline-2-carboxaldehyde, then analyzed using capillary electrophoresis (CE). Histamine was identified in both male and female Drosophila brain samples. This process can be repeated at key time points throughout a 24-hour period, and the combination of DAM/CE data can be used to examine histamine metabolization throughout the sleep/wake cycle of individual flies, showing promising implications for the use of targeted metabolomics to understand fly circadian rhythms and behavior.
Regulation of Cellular Apoptosis and Proliferation by PHL tract deletions in PHLDA1

Undergraduate - Physiology and Biophysics

Pleckstrin homology-like domain, family A, member 1, more commonly known as PHLDA1, is a protein-encoding gene which has received increasing attention over the last decade due to its complex and widely composite functional role. The gene encodes a protein that is 401 amino acids in length and particularly rich in polyglutamine (QQ), proline-glutamine (PQ), and proline-histidine (PH) tracts with a PHL domain. The aim of this project was to investigate the phenotypic effects of certain deletions within the PHL domain, using proliferation and apoptotic assays. The proliferation assay consisted of the CELIGO apparatus and the Hoechst stain. During the apoptotic assay, various proteases called caspases were activated to cleave the protein. Fluorogenic substrates were then introduced into the cells, and these reagents entered the cell in inactive forms. Caspase 3/7 then cleaved the substrate and certain cells became fluorescent upon cleavage. Those exhibiting red fluorescence were designated as in the process of dying, whereas the dead cells were detected with propidium iodide (PI). Analyses are currently underway; however, data has so far indicated that the deletion of the C-terminus region which encodes the PQ and PH stretches, otherwise known as the ACT region, resulted in decreased cell proliferation. This project served as a prelude to a current experiment in which we further investigate the location on the C-terminal domain which contributes to this known effect on proliferation within MCF-7 cells. The implications of this project are widespread, as cell proliferation is a marker for tumor growth within the realm of cancer. The PHLDA1 gene is known to play a pro-apoptotic role and heavily affect cell proliferation, which contributes to tumor growth and metastasis. This project sheds new light on the function of the PHL domain and further illuminates the role of the PHLDA1 gene in breast cancer cells.

Synthesis and Electrochemical Properties of LNMC Nanocrystals with Core-Shell Structure

Undergraduate - Chemistry

Undesired reactions at the interface between a transition metal oxide cathode and a nonaqueous electrolyte impose challenges in the durability performance of Li-ion batteries. Surface passivation of active electrodes by inactive oxides can reduce the undesired reactions. Currently the existing strategies, such as coating, can give gains in the electrode performance. However the lack of fine control of the surface film with high uniformity and ultrathin thickness limits the ability to design the electrode's chemical structure and enhance functionality. Core-shell structures at the nanocrystal level allow accurate control with surface structure, composition, and thickness. Thus core-shell structures produce a reasonable building of complex heterostructures that can offer creative solutions to the durability of Li-ion batteries. We explore core-shell heterostructures consisting of Lithium Nickel Manganese Cobalt Oxide (LNMC) nanoparticles.
as the core and Aluminum Oxide (Al2O3) as the shell. The resultant LNMC@Al2O3 core-shell electrodes were characterized by X-ray diffraction (XRD), microscopy, and electrochemical properties. XRD revealed a spinel or layer structure with a tunable ratio. Microscopy showed a ~2nm Al2O3 thin film well dispersed on the surface of LNMC nanoparticles. Analysis of electrochemical properties demonstrated that core-shell nanoparticles had better stability than bare nanoparticles.

119. Hassan, Shireen and Aitha, Niharika

**Patient's Comfort in Dentists vs. Physicians**

*Undergraduate - Dentistry*

The purpose of the research study we are conducting is to understand what topics patients are comfortable sharing with their dentist/primary care physician and the multiple factors that contribute to the poor health care of the minority populations. The research was conducted at the University of Illinois College of Dentistry’s pediatric department; a survey was handed to those parents willing to participate in the study. The objective of the study is to determine the impact of a patient’s demographics on his/her oral health. This research is specifically exploring the effect of one’s lifestyle on their oral health. The survey was composed of multiple questions including those regarding demographics (race, ethnicity, educational level, range of household income, etc.), physical health (dietary habits, weight, medications, etc.), behavioral health (depression, anxiety, alcohol abuse, etc.), and finally oral health (condition of their teeth, and their tooth brushing habits). The parent of the patient was asked to complete the survey and answer the questions pertaining to his/her lifestyle, as well as the child's. The survey was provided in both English and Spanish. One of our initial observations was that the great majority of patients were Spanish-speaking. The analysis of the results will highlight the key obstacles that prevent many individuals from accessing proper healthcare, whether it may be a financial issue, lack of insurance, or cultural/language barrier. Ultimately, the aim of the study will be to spread awareness of the disparities and unequal distribution of healthcare to populations of differing social standing.

120. Hernandez, Genesis

**Exploring the History of Sanctuary Cities**

*Undergraduate - History*

This project will research the history of sanctuary cities to find commentary on modern American policy. A sanctuary city is a "city (or a county) that limits its cooperation with federal immigration enforcement agents in order to protect low-priority immigrants from deportation" (AmericasVoice.org). Before being a buzzword in today's news, sanctuary cities have dated back to ancient times. I will primarily analyze how the concept of seeking sanctuary developed over time, including in the United States. Through controversy and debate, sanctuary cities continue
to remain a dynamic and tangible reality in our society. Given this administration's increasingly anti-immigrant rhetoric and legislation, sanctuary cities are especially relevant in understanding modern American policy today.

121. Herrera, Citlaly

**Accent ratings in Spanish/English Bilingual/Monolinguals**

*Undergraduate - Hispanic and Italian Studies*

This research project aims to identify potential differences in the way that monolinguals and bilinguals evaluate accents of early Spanish/English bilinguals (i.e., heritage Spanish speakers) in both English and Spanish. Comparing monolingual and bilingual evaluations allowed to test the hypothesis that monolinguals rate Spanish/English bilingual accents more critically than the bilingual raters. Judgments were made based on 10-15 second speech samples in English and Spanish from XX English/Spanish bilinguals. In order to isolate accent from other linguistic constructs, excerpts did not contain any grammatical errors, dialectal colloquialisms, or proper names. The English samples were evaluated by monolingual English speakers and early English/Spanish bilinguals both residing in the United States; Spanish samples were evaluated by early English/Spanish bilinguals residing in the United States and monolingual Mexican Spanish speakers residing in Mexico. Evaluators rated each sample for degree of accentedness using a 1-9 rating scale in which 1 equals “without a doubt, not a native speaker” and 9 equals “without a doubt, a native speaker”. Data collection is ongoing, and the final data set will be fit to a linear mixed model with rater type (bilingual/monolingual) and language (English/Spanish) as fixed effects and rating (1-9) as the dependent variable. The outcome of this project will provide insight into the language attitudes towards accented speech, and will inform the way that we use accent ratings as a correlate of oral proficiency, in particular, what profile of raters is ideal when the participant population speak a contact variety of a language.

122. Herrera, Denisse; Young, Alexandria E. and Burdette, Joanna E.

**Phyllanthusmins: A Potential Natural Product Chemotherapeutic for the Treatment of Ovarian Cancer**

*Undergraduate - Biological Sciences*

High-grade serous ovarian cancer (HGSOC) is the most lethal gynecological cancer, responsible for over 22,000 new cases every year and accounting for 70-80% of ovarian cancer deaths. Though commonly treated with a combination of surgery and platinum-based chemotherapy, many patients often experience relapses, and responses to subsequent therapies are generally short-lived. Natural products and their derivatives have historically been a productive source for chemotherapeutics. Previous research has found phyllanthusmins, a new class of natural product, to exhibit anti-cancer effects in vivo and in vitro when evaluated in several cancers. This project’s aim was to study the antitumorigenic effects of a large library of phyllanthusmin...
analogues against ovarian cancer cell lines, OVCAR3 and OVCAR8, and begin to elucidate their unique mechanism of action. OVCAR3 and OVCAR8 were treated with three phyllanthusmin analogues (PHY25, PHY30, PHY34) in varying doses for three days. Effect on cell viability was measured using sulforhodamine B (SRB) assays, revealing the most potent analogue to be PHY34 with an IC50 of 4.1nM in OVCAR8 and an IC50 of 3.9nM in OVCAR3. Results also identified a dose-dependent reduction of cell viability. Western analysis determined PHY34 exerts its apoptotic efficacy through the inhibition of autophagy at a late stage in the pathway. Rapamycin, an autophagy inducer, rescued cell death seen after PHY34 treatment, suggesting autophagy inhibition is a requirement of its apoptotic mechanism. Intraperitoneal xenografts of PHY34 in mice also significantly reduced ovarian tumor burden in vivo. Clonogenic assays demonstrated that PHY25, PHY30, and PHY34 are not cytostatic, but, in fact, cytotoxic in OVCAR8 at 10nM. These findings support phyllanthusmins as valuable leads for potential new therapeutics for ovarian cancer, expanding treatment options for patients with HGSOC.

123. Huang, Chun-Hao and Foucher, Kharma

**Step Length Asymmetry and its Associations with Mechanical Energy Exchange, Function, and Fatigue after Total Hip Replacement**

*Graduate / Professional - Kinesiology and Nutrition*

**INTRODUCTION:** Total hip replacement (THR) does not always restore normal gait mechanics – including gait symmetry. For example, differences in step length between the two limbs have been reported during the early postoperative months [1]. It is not known whether step length asymmetry in longer-term THR patients is clinically meaningful or has other functional or biomechanical consequences. The purpose of this study was to explore step length asymmetry and its links to other aspects of gait and physical function in people 1 to 5 years after THR. We hypothesized that people 1-5 years after THR have (a) statistically and (b) clinically significant step length asymmetry (c) which is associated with worse mechanical energy exchange during gait and fatigue. (d) We also explored interrelationships among these factors.

**METHODS:** Participants: 14 THR patients (5 M/9 F, months post-surgery 24 ± 9, age 56 ± 9, and BMI 33.9 ± 9.6) were included in the study.

Variables: (1) Step length asymmetry: symmetry index (SI) [2].

(2) Mechanical energy exchange (MEE): % Recovery [3].

(3) Functional outcomes: distance of 6-minute walk test (6MWT).

(4) Fatigue: Score of Patient-Reported Outcomes Measurement Information System(PROMIS) - Fatigue – Short Form 7a [4].

Gait Analysis: Standard published methods. Average at least 3 successful trials at each participants’ self–selected walking speed.
Statistical Analysis: (a) One sample T-test (b) Pearson correlations (c) Pearson correlations (d) Pearson correlations.

RESULTS:
- SI was $7.3 \pm 10.5$ (p=0.021).
- SI was correlated with 6MWT ($R=-0.570$, p=0.033) (Figure 1).
- MEE was $55.1 \pm 16.3\%$.
- SI was not correlated with MEE ($R=-0.139$, p=0.635).
- SI was not correlated with fatigue ($R=0.179$, p=0.540).
- MEE was correlated with fatigue ($R=0.529$, p=0.052) (Fig 2).
- MEE was not correlated with 6MWT ($R=0.098$, p=0.709).
- Fatigue was correlated with 6MWT ($R=-0.572$, p=0.033).

DISCUSSION:
- People 1-5 years after THR have (a) statistically and (b) clinically significant step length asymmetry.
- Step length asymmetry is (c) not associated with MEE and fatigue.
- MEE is (d) associated with fatigue but not function. Fatigue is associated with function.
- Step length asymmetry is similar to published data5.
- MEE after THR is between hip osteoarthritis and healthy control groups6.
- Surprisingly, the MEE and self-reported fatigue is neared positive significantly correlated. Suggest people who are experiencing more fatigue are able to adapt their gait in a way that conserves energy.

REFERENCES:

124. **Huang, Shaina**

_**Resveratrol and dietary anthocyanins enhance osteoblast proliferation and reduce osteoclastogenesis in cultured osteoblasts and transgenic_
Evidence from a combination of observational, experimental, clinical and interventional studies strongly points to a positive link between high consumption of dietary flavonoids and anthocyanins and indices of bone health. However, the mechanism by which these naturally occurring compounds control the activity of osteoclasts and osteoblasts to improve bone health remains unclear. The objective of this work was to determine the effects of resveratrol and anthocyanins on osteoblastogenesis and osteoclastogenesis in hFOB human osteoblasts and transgenic (dT; osterix:mCherry) and (tT; rankl:HS:CFP/ctsk:mEGFP/osx:mcherry) medaka. hFOB human osteoblasts were obtained from ATCC and cultured in 1:1 mixture of Ham's F12 Medium Dulbecco's Modified Eagle's medium, with 2.5 mM L-glutamine (without phenol red). Transgenic medaka (dT; osterix/Sp7:mCherry);(tT; rankl:HS:CFP/ctsk:mEGFP/osx:mcherry) were maintained at UIC under protocol #17-166. Larvae at 9-12 dpf were staged and then treated for 5 days with the extracts and compounds (0-10 g/ml). Osteoblast and osteoclast formation and distribution were analyzed by fluorescence microscopy, bone mineralization was visualized by Alizarin red and calcein. Resveratrol and anthocyanins increased osteoblast proliferation of human hFOB 1.19 osteoblasts and reduced apoptosis by up-regulating HDAC1 and SIRT1 mRNA expression. These compounds also enhanced osteoblast formation and differentiation osx/Sp7:mCherry medaka. In tT rankl:HS:CFP/ctsk:mEGFP/osx:mcherry medaka, treatment with resveratrol initially increases osteoclast differentiation but then reduces the stability of the RANKL-induced osteoclasts and blocks their function, thereby reducing bone resorption, with an optimal dose of 5 μg/ml. Delphinidin also reduced the formation of osteoclasts in a dose dependent manner with 10 μg/ml being the optimal dose. Resveratrol and anthocyanins enhanced osteoblast proliferation and differentiation and improved bone integrity in osx/Sp7:mCherry medaka. In triple transgenic RANKL medaka, delphinidin and resveratrol reduced osteoclastogenesis and bone resorption. In vitro, these compounds act as HDAC1 and SIRT1 agonists, suggesting epigenetic regulation, and they also reduced mitochondrial based apoptosis suggesting possible mitochondrial regeneration.

125. Hughes, Steven; Lebowicz, Leah; Mount, Kristin and Brennan, Kevin

Evaluating the effectiveness of a prediabetes treatment decision aid presented as a series of infographics.

Women diagnosed with gestational diabetes mellitus (GDM) during pregnancy have an increased risk of developing type 2 diabetes mellitus (T2DM) (Aroda et al., 2015). This risk is further increased by the presence prediabetes. Affected women can prevent the onset of T2DM by undergoing major lifestyle changes and/or taking medication, or they may choose no treatment at all. Patient decision aids (PDAs) are tools used to help patients make an educated and informed choice in regards to their medical treatment. Studies show that PDAs, although generally effective, can be improved upon in terms of guiding a patient towards an informed decision (Hawley, Newman, Griggs, Kosir, & Katz, 2016; Sepucha et al., 2013). This research study will
develop a web-based encounter decision aid composed of a series of infographics to help women at risk of developing T2DM make an informed choice regarding their treatment. This aid will be evaluated for its acceptability, effectiveness, and educational value. This study may lead to a better understanding of the best method with which to create successful PDAs in the future.

126. Hussaini, Qaswa; Zulauf, Courtney and Zinsser, Katherine

**Gender Reference in the Classroom and its Relationship with Classroom Discipline**

*Undergraduate - Psychology*

Prior research shows that preschoolers are expelled at a 3 times higher rate than expulsions in K-12. The rate of expulsion in preschool boys is disproportionately higher as compared to preschool girls. The disruption of early education leads to lasting negative ramifications for every child that is expelled from the classroom. Although there is considerable amount of research that highlights the major consequences of early expulsion on children’s academic and social trajectory, little can be said about possible underlying causes. Specifically, underlying causes related to child gender and teacher discipline. The current study aims to examine this relationship using a linguistic approach to study teachers’ usage of gendered language (i.e. he/she) versus neutral language (i.e. they, them, their,) in the classroom to analyze how teachers’ reference to gender may be related to how teachers view child behavior, behavior management, their ability to manage the child, and ultimately taking extreme disciplinary action such as expulsion. Exploring the underlying issues that contribute to the alarmingly high rates of preschool expulsion would bring researchers closer to understanding the complex factors that are not otherwise visibly identifiable. Data for this study comes from the follow-up interview phase collected from teachers at community-based programs across 13 diverse Chicago neighborhoods. Surveys (N=126) addressed teachers’ requests for expulsion. Follow-up interviews (N=27) focused on teacher’s experiences supporting children’s social-emotional development. A codebook was developed using the following codes: male, female, general, valence of behavior management strategy, and valence of teacher efficacy. Transcripts are being coded for instances where teachers use gendered and non-gendered references to positive or negative child behavior. Transcripts are further being coded for teacher description of behavior management strategies and how efficacious the teacher feels about handling the child. Qualitative matrix comparisons will be conducted to analyze the co-occurrences of extracted themes from coded transcripts.

127. Ideis, Shukri

**The History of Birth Control and the Relationship with African American Communities and Elites**

*Undergraduate - Liberal Arts and Sciences*
This research covers the history of birth control from early 1900's until modern times. It will start with W.E.B Du Bois and will end with prevalent speakers among Black circles. The attitude of birth control is dynamic in history.

128. Ilenikhena, George

Tooth Movement in Dicer-Deficient Mice

Undergraduate - Honors College

Objective: The goal of this study was to evaluate the effects of a lack of Dicer on tooth movement in mice postnatally. Previous research showed that the postnatal conditional deletion of Dicer in calvarial osteoblasts and suture cells of mice carrying osterix (Osx) promoter resulted in increased calvarial bone volume, thickness, mineral density, and suture closure. (Atsawasuwan P. et al., 2017). However, the effects of Dicer deficiency on tooth movement is unknown.

Materials and Methods: This study recruited Dicer-deficient mice under Osx promoter (Osxcre + /Dicer fl/fl ) along with the control sets: Osx-cre transgenic mice (Osxcre + /Dicer fl-/- ) and the control littermate (Osxcre - /Dicer fl/fl ). Cre recombinase strategy was utilized to conditionally remove the Dicer gene. The parent mice were bred with doxycycline-containing water until the pups were born, to inhibit the activity of cre recombinase. The doxycycline water was removed from the animals at birth. At 10 weeks old, a 2-cN expansion spring was installed onto the lower incisors to move the animals’ left first mandibular molar for 2 weeks. Then the Dicer-deficient mice and their controls were sacrificed and the mandibles were studied for tooth movement using Faxitron® radiography. The distance of tooth movement was measured using Adobe photoshop program to ultimately determine the effects of Dicer deficiency on tooth movement. Results: The Dicer-deficient mice exhibited abnormal tooth movement, compared to the control groups, Osx-cre transgenic mice and control littermate mice. In addition, the results suggested that male Osxcre + /Dicer fl/fl mice showed significantly more distance of tooth movement than their controls (Osxcre-/Dicer fl/fl and Osx-cre) mice, while females Osxcre + /Dicer fl/fl mice showed the significantly more distance of tooth movement than the Osx-cre but not their control littersmates. We speculated that the sex hormone might play a role during the tooth movement in P70 days old mice. Conclusion: Dicer and functional microRNAs are important for proper tooth movement and bone remodeling.

129. Illner, Gregorio; Malone, Margaret and Brown, Joel

How Invasive Algae Can Shape Benthic Communities of Hawaiian Coral Reefs

Undergraduate - Biological Sciences

Coral reefs are extremely diverse ecosystems and play an important role in coastal and island economies. Recent research in coral reef ecology shows that reef ecosystems worldwide are suffering the impacts of human activity. These events, when coupled with natural disturbances such as hurricanes, widespread diseases, and large algal blooms, devastate reefs. In this study we
assessed the coral cover and structure on the patch reefs of Kane’ohe Bay, Hawaii. Events such as population growth, urbanization and agriculture development have greatly affected these reefs throughout the years. Invasive algae, Eucheuma and Kappaphycus, deeply impacted some reef patches in the bay. More recently, Kane’ohe Bay reefs went through a recent bleaching event that caused a major die-off of the previously mentioned invasive algae. I hypothesized that healthy reefs (with no history of invasive algae) will have higher structural complexity and coral cover compared to degraded reefs (impacted by the invasive algae). I compared the mean rugosity of affected and unaffected reefs through the use of 3D photogrammetry methods, using the structure-from-motion (SfM) technique. Preliminary results suggest a difference in benthic community, coral cover, and rugosity between the healthy and degraded reefs, with the healthy reefs showing more structure. These results demonstrate the long term impacts that invasive algae species can have on coral reefs.

130. Iqbal, Nuzhat

Do Topical antimicrobial prophylaxis prevent surgical wound infections in patients who have undergone colorectal surgery?

*Undergraduate - Biological Sciences*

A common complication that can arise after colorectal surgery is surgical site infections (SSIs). To help combat this problem, antimicrobials, such as antibiotics and antiseptics, are often utilized during surgery. The antimicrobials are applied to the skin immediately after wound closure. In order to determine if this method was effective in preventing SSIs, all clinical studies that used topical antimicrobial prophylaxis in colorectal surgery were obtained through Medline, Embase, and the Cochrane Register of Controlled Trials. The risk of bias was assessed for each of the studies, and the preoperative antibiotic prophylaxis that was used was noted. The overall quality of the evidence for each individual intervention was assessed using GRADE. The type of intervention used in each study varied. The interventions included gentamicin-impregnated sponges or bead wound inlay, chlorhexidine-impregnated sutures, direct wound lavages, powder applications, or injections of antibiotics before closure, ionized silver dressing applied to the closed skin, and vitamin E oil applied to the open wound. Across all interventions, there was a significant decrease in SSIs in patients who had one of these interventions applied to them during their colorectal surgery. From this conclusion, the question of combined intervention arises. In the future, studies that examine the effect of using a composite of topical interventions can be conducted because no such randomized trial currently exists.

131. Jagatramka, Ritesh; Obregon, Javier and Strow, Meredith

Detection of corrosion in SiC using NDE

*Graduate / Professional - Civil and Materials Engineering*
Corrosion of silicon carbide (SiC) was induced in high temperature and acidic environments to simulate applications of the material, such as in jet engines and electronic devices. SiC samples were 1) placed in a tube furnace for various amounts of time at 1200ºC for high-temperature corrosion, or 2) partially submerged in one of three acidic electrolytes (HCl + NaCl, HNO3, H2SO4) for open-circuit potential (OCP) and potentio-dynamic polarization (PDP) testing. Immersed ultrasonic testing (UT) and scanning electron microscopy were used to confirm oxidation and corrosion within high-temperature samples. Acoustic emission (AE) testing was ongoing through the OCP and PDP testing, and immersed UT and SEM was also used to confirm corrosion characteristics related samples. Correlations between AE activity, immersed UT, and SEM indicate that acoustic emissions testing and ultrasonic, non-destructive test method, can detect corrosion in silicon carbide.

132. Jayakumar, Ashik and Laila Ghatalah

**Mitochondria Adjacent to Ribbon Synapses in Vestibular Hair Cells Are Not Polarized Toward the Synapse**

*Undergraduate - Anatomy and Cell Biology*

Mitochondria are generally known as “the powerhouses of the cell”. In our research, 3D models of mitochondria in vestibular hair cells were constructed from electron microscope (EM) tomograms to understand the structural role of their internal cristae in support of neuronal activity at ribbon synapses. The mitochondrial inner compartment is made up of the inner mitochondrial membrane and the cristae. Recent EM tomography studies have shown us that these two membrane domains are connected by small tubular structures known as crista junctions (CJs). CJs “have been proposed to regulate the dynamic distribution of proteins, lipids, and soluble metabolites between mitochondrial sub compartments” (Zick et al. 2009). Mitochondrial cristae are the location of most of the enzymes and are responsible for cellular respiration and ATP production, and therefore play an essential role in cellular activities. A ribbon synapse is known to be a ‘high capacity docking site’ of synaptic vesicles that provide the fusion sites for ‘active zones’ and they are known to have a large supply of “immobile synaptic vesicles rapidly available for exocytosis” (Schmitz et al. 1996). The vesicles are powered by ATP produced by mitochondria. The goal of this study was to test the hypothesis of whether the distance of a mitochondrion from a synapse would have an influence on the number of crista junctions (CJs) in the mitochondrion. Our hypothesis is that cristae present in the mitochondrion are oriented perpendicular to the ribbon and would be expected to demonstrate a higher number of CJs on the side of the mitochondrion facing the ribbon synapse. Using our reconstructions, the number of CJs present in a mitochondrion is counted. In our tomograms, we observed that the ratio of CJs towards the ribbon to the CJs away from the ribbon synapse is close to 1:1 regardless of the distance from the ribbon synapse. From this we can conclude, despite the cristae being oriented perpendicular to the ribbon synapse, the distance from the synapse apparently does not affect whether CJs are more prevalent on the side adjacent to the synaptic ribbon in vestibular hair cells.
Survey of Unregulated Contaminants in Water Supplies Across Illinois

Undergraduate - Public Health

The monitoring of public drinking water across the United States has come a long way since the passing of the Safe Drinking Water Act (SDWA) in 1974, which outlined rules and regulations on various contaminants found in public drinking water. While not all dangerous contaminants are regulated, some are being monitored by the Environmental Protection Agency (EPA) through the Unregulated Contaminants Monitoring Rule (UCMR). In this project, water quality data from the UCMR 3, which was collected by the EPA between the years of 2013 and 2015, was analyzed for the state of Illinois. Using the UCMR 3 data set and the statistical program R Studio, 44 contaminants were analyzed based on whether or not they were found to be above their Minimum Reporting Level (MRL) in various types of water supplies, including groundwater and surface water. Out of the 44 contaminants found in Illinois, 26 (59.1%) were found to be above their MRL in at least one public water supply. Among the 43 contaminants observed in groundwater supplies, 22 (51.2%) of contaminants were above their MRL in at least one public water supply. Among the 33 contaminants observed in surface water supplies, 16 (48.5%) of contaminants were found to be above their MRL in at least one public drinking supply. In both groundwater and surface water supplies, the most abundant type of contaminant found above the MRL was metals. Seasonal patterns in abundance will also be analyzed for contaminants consistently above the MRL. Additional research is needed to understand the potential health risks associated with the levels of unregulated contaminants, which are consistently found to be above their MRL.

Genetic Transformation in Streptococcus pneumoniae: Efficient Gene Transfer in a Transient High-Density Cell Assemblage

Undergraduate - Biological Sciences

Since Griffith's discovery of a gene transfer mechanism now known as genetic transformation, many approaches to modeling the natural exchange process in S. pneumoniae have been developed. Each approach offers a combination of advantages and short-comings in the search for understanding of the natural mechanism. Transformation in transiently-activated cultures by addition of purified donor DNA has the advantage of simplicity. However, this model requires unnatural growth conditions. A different model, biofilms in vitro, remedies both limitations by offering a more natural growth environment depending strictly on living target cells as a source of transferred genes. To combine the temporal resolution and experimental control of the classical transformation format, we developed a novel system for studies in horizontal gene transfer in S. pneumoniae. In this system, gene transfer between living cells depends on competence development within a short-term assemblage of competent and target cells at high densities characteristic of natural biofilms. To create the assemblage, mixed strains are collected...
on a Millipore filter at 20 cells/μm². Upon infiltration of competence stimulating peptide (CSP), RifR competent cells lyse neighboring competent defective NovR SpcR cells, releasing DNA available for uptake. Gene transfer was optimized with respect to aeration, temperature, time, and growth media. Yields were highest between 34°C and 37°C. Up to 0.005% of RifR cells in the assemblage acquired the SpcR marker from neighboring cells within two hours. DNA uptake was detected 20 minutes after infiltration of CSP, and was largely completed by 60 minutes. As 1% of SpeR transformants also acquired the NovR marker; this high rate of congression suggests that a minority of RifR cells were highly competent or had access to lysed target cells. A novel transient cell assemblage allows for the study of gene transfers at biofilm-like cell densities with precise temporal control of competence through CSP induction.

135. Jin, Vivian; Dean, Matthew and Burdette, Joanna E

**Colonization of the Ovary and Metastasis of Fallopian Tube Derived Cancer**

*Undergraduate - Medicinal Chemistry and Pharmacognosy*

High-grade serous ovarian cancer (HGSOC) is the most lethal gynecological cancer and recent evidence has shown that it originates from the fallopian tube epithelium. Tumorigenic mouse fallopian tube cells grafted into the ovarian bursa produced aggressive tumors that metastasized throughout the peritoneum, whereas the same number of tumorigenic cells injected into the peritoneal space did not cause tumor formation, demonstrating that the ovary increases aggressiveness of the disease. Factors suppressing ovulation are inversely related to the risk of HGSOC, and by mimicking the physical tearing of the ovary, we demonstrated that ovulation promotes ovarian colonization by exposing the underlying extracellular matrix. 3D collagen, a primary component of the extracellular matrix, rescued the viability of normal fallopian tube cells but not tumor cells, suggesting that pathways modified during formation of HGSOC in the fallopian tube contribute to ovarian colonization. Using mouse fallopian tube cells mutated to mimic alterations commonly observed in HGSOC, it was observed that the loss of PTEN activated AKT and RAC1/JNK signaling, which increased viability on 3D collagen, increased invasion through collagen, and increased attachment to mouse ovaries. Therefore, loss of PTEN activates multiple pathways that together enhance colonization of the ovary, a critical step in the metastasis of fallopian tube-derived high-grade serous ovarian cancer. These pathways represent novel targets to prevent colonization of the ovary and inhibit the aggressive nature of the disease in HGSOC patients.

136. Johnson, Scott; Koster, Kevin P. and Yoshii, Akira

**Dark-rearing Exacerbates Lipofuscin Accumulation and Impairs Developmental Inhibitory Circuit Maturation in Infantile Neuronal Ceroid Lipofuscinosis**

*Undergraduate - Liberal Arts and Sciences*
Infantile Neuronal Ceroid Lipofuscinosis (CLN1) is a neurodegenerative disorder affecting 1 in 12,500 infants. CLN1 presents with epilepsy, myoclonic seizures, ataxia, psychomotor retardation, early visual loss, mental retardation and a life expectancy of ~5 years (Santavuori et al. 1974). CLN1 is characterized by mutations in the lysosomal enzyme, palmitoyl protein thioesterase 1 (PPT1). PPT1 is required to remove palmitate residues from proteins to encourage their breakdown. Without the action of PPT1, palmitoylated proteins cannot be recycled, leading to the characteristic accumulation of autofluorescent proteolipid material in neurons or lipofuscin. Seizures are a primary symptom of CLN1, indicating a reduction or impaired maturation of inhibitory neuronal circuitry (Mole, 2001). There is no research characterizing lipofuscin accumulation or cortical inhibitory circuit alterations during early-stage disease in CLN1 mouse models. There is also no research examining the effect of neuronal activity, which is critical for inhibitory circuit maturation in cortex, on lipofuscin accumulation and developmental changes in the inhibitory circuit. Thus, to determine the role of neuronal activity in lipofuscin deposition and inhibitory circuit maturation in CLN1, we dark-reared wild-type (WT) and PPT1-null mice, effectively reducing neuronal activity in the visual cortex. We examined lipofuscin accumulation and inhibitory neuron characteristics in both normally-reared and dark-reared animals. Lipofuscin accumulates as early as postnatal day 14 in normally-reared, PPT1-deficient mice. Normally-reared PPT1-deficient mice demonstrate decreased number of inhibitory neurons and inhibitory connections in visual cortex compared to WT mice. Interestingly, dark-rearing exacerbates lipofuscin accumulation and further reduces inhibitory circuitry in the PPT1-deficient visual cortex. These results indicate that PPT1-deficient mice have impaired cortical inhibitory neuron maturation concurrent with lipofuscin accumulation, and that lack of neuronal activity exacerbates these pathologies. Together, these data indicate that impaired development of inhibitory circuitry may be an underlying mechanism of CLN1 disease progression and serve as a novel therapeutic target.

137. Jones, Jasmine and Coba-Rodriguez, Sarai

Strategies for increasing parental involvement among low-income, African American Montessori parents

Graduate / Professional - Educational Psychology

The purpose of this research project is to foster parent engagement at the Montessori School of Englewood (MSE). Researchers consistently report that high levels of parental engagement, broadly defined to include home- and school-based activities, in children’s education is beneficial to children’s social and educational development. While the topic of parental engagement and its impact on academic achievement has been well documented in the literature, researchers continue to report low levels of parental engagement for low-income, African American families. Of the students enrolled at MSE, 97% are African-American. More than half (53%) of MSE families fall below the poverty level. The goal of this project is to increase home-school collaboration among MSE parents and teachers since research suggests that children fare better in school when collaborations are forged between home and school. Researchers paid
particular attention to activities that reflected parent/family strengths and cultural and community resources. To increase parental involvement, the researchers hosted four events between December and April. These events included: Family Music and Dance Night, Plant Night, and Montessori 101. Family Music & Dance brought families together where they danced away with their child, while networking with other parents and teachers. Plant Night invited parents to learn about ways to manage stress and time management. Montessori 101 was a workshop, led by MSE teachers, that answered questions from parents regarding the Montessori and Afrocentric curriculum. Researchers strategized increasing the amount of parents at the events by printing flyers for events in color at least two weeks before the event. Incentives such as free food at events was also a priority. Researchers also utilized teachers’ assistance by remind parents at drop-off and pick- up about events. Preliminary findings include increased parental involvement at MSE when the mentioned strategies were used, and when topics/events are related to parents’ needs.

138. Joniak, Ronald and Ugalde, Claudio

**Neutron Star Mergers and the R-Process**

*Undergraduate - Physics*

About half of the elements of the periodic table that are present today in the Solar System were synthesized before the formation of the Sun via a rapid neutron capture process (r process). However, the astrophysical site of the r process is a longstanding problem that has captivated both experimental and theoretical astrophysicists. Up to date, two possible scenarios for the site of the r process have been suggested: the first involves the high entropy wind of core collapse supernovae, and the second corresponds to the merger of two compact stellar objects such as neutron stars or a neutron star-black hole pair. In this work, we will study the robustness of the nucleosynthesis abundance pattern between the second and third r process peaks as produced by neutron star mergers with r process-like neutron exposures. We will do this through the Truran r-process code[1] coupled with density and temperature trajectories obtained from hydrodynamical calculations from Rosswog et al. 2013[2]. First, we will vary parameters to obtain an understanding of the astrophysical mechanisms that create the r process. Next, we will create a program to obtain the best possible parameters based on a chi-squared test. Once we have the best fits, we will test the effect of fission in the overall isotope abundance pattern distribution. Later on, we will vary the ratio of masses of the two fission fragments and study its effect on elemental abundances. One last parameter to vary will be the ratio of the masses of neutron star pairs. Ultimately, we hope to gain an understanding of the astrophysical origin of the r process.


139. **Kang, Christina**

**Characterization of Brain Extracellular Vesicles in a Model of Metachromatic Leukodystrophy**

*Undergraduate - Biological Sciences*

Extracellular vesicles (EVs), secreted by most cell types, are of great interest in the scientific community due to their capability of mediating intercellular communication. EVs possess the potential to be utilized as biomarkers and therapeutic agents. Lately, EVs are being recognized as contributors to the pathogenesis of neurodegenerative diseases, which includes Metachromatic Leukodystrophy (MLD). We hypothesize that the dynamics of EVs are relevant in understanding the pathophysiology of MLD. This disease is caused by a deficiency in Arylsulfatase A, leading to the accumulation of sulfatides, especially in oligodendrocytes, and causing demyelination.

EVs isolated from brains of MLD mouse models were characterized along their life span. Postnatal day 30 (P30, peak myelination), 3 month (3M, adult) and 6 month (6M, demyelination in MLD/Knockout (KO) mice) brains of both sexes were studied. We followed a modified protocol from Perez-Gonzalez., (2012) to isolate the EVs. Nanoparticle tracking analysis (NTA) was utilized to compare size distributions and concentrations of EVs either subjected or not subjected to a sucrose gradient centrifugation. NTA revealed that the sucrose fractionation resulted in heterogeneous size populations within each fraction. Protein, cholesterol, and EVs/cell marker contents were characterized. Results demonstrated that EVs isolated from brains of both genotypes contained similar protein concentrations, although we observed a gradual increase with age. EVs were enriched in cholesterol as well. Post hoc analysis of EVs that were subjected to sucrose fractionation allowed us to show that MLD/KO brains seem to have increased concentrations of EVs of different sizes. Further investigation is necessary to determine if EVs are the result of plasma membrane blebbing or released from diverse origins. Our study provides the first insight into the dynamics of EVs in the brains of healthy versus MLD/KO mice, and supports the fact that these dynamics seem to be tightly regulated.

140. **Karthikeyan, Subbulakshmi; Lantvit, Daniel and Burdette, Joanna**

**Prolactin Signaling Drives Tumorigenesis In Human High Grade Serous Ovarian Cancer Cells And In A Spontaneous Fallopian Tube Derived Model**

*Graduate / Professional - Biomolecular Sciences, Pharmacognosy*

The fallopian tube epithelium (FTE) can give rise to high grade serous ovarian cancer (HGSOC), however the pathways responsible for tumorigenesis are still poorly understood. A human prolactin (PRL) like gene, Prl2c2 was amplified >100 fold in a previously developed spontaneous model of FTE-derived ovarian cancer called MOEhigh (murine oviductal epithelium high passage). Stable knockdown of Prl2c2 in the MOEhigh cells demonstrated a significant reduction in cell proliferation, 2-dimensional foci, anchorage independent growth, and completely blocked tumor formation. The overall survival of ovarian cancer patients from transcriptome analysis of 1868 samples was lower when abundant PRL and prolactin receptors...
(PRL-R) were expressed. However, the role of PRL in human FTE and HGSOC derived from FTE is unclear. A HGSOC cell line (OVCAR3) and a tumorigenic human FTE cell line (FT33-Tag-Myc) were treated with recombinant PRL and a significant increase in cellular proliferation and 2D foci formation was detected. A CRISPR/Cas9 mediated PRL-R deletion in OVCAR3 and FT33-Tag-Myc cells demonstrated significant reduction in cell proliferation and eliminated tumor growth using the OVCAR3 model. PRL was found to stimulate cellular proliferation and transformation, primarily by activating AKT, STAT5, m-TOR and ERK in human FTE and OVCAR3 cells. This study identified Prl2c2 as a driver of tumorigenesis in a spontaneous model and confirm that prolactin signaling supports tumorigenesis in high grade serous ovarian cancer.

141. Kazari, Hanie; Kabir, Minoo and Ozevin, Didem;

Miniaturized Acoustic and Ultrasonic Transducers for Cost-Effective, Real-Time Weld Quality Assurance

Graduate / Professional - Civil and Materials Engineering

Acoustic emission (AE) and ultrasonic (UT) are nondestructive evaluation (NDE) methods. AE is a passive method that relies on the energy release of active flaws, while UT is an active method which consists of high frequency sound energy, functions based on the reflection of waves from flaws surface. The NDE methods have paramount importance in welding quality evaluation since they are able to evaluate a welded component (or material to be welded) without any impact on the serviceability of the part or material. The nature of these NDE methods requires highly sensitive transducers in addition to low power and lightweight characteristics. With the advancement of micro-electro-mechanical systems (MEMS), acoustic emission (AE) and ultrasonic (UT) transducers can be developed with low power consumption, miniaturized sizes and low-cost process. In this study, the AE and UT transducers operating in plate flexural mode driven piezoelectrically known as Piezoelectric Micromachined Ultrasonic Transducers (PMUTs) are presented. The transducers are manufactured using PiezoMUMPS process by MEMSCAP and tuned to different frequencies for various applications. The PiezoMUMPs is a 5-mask level SOI (silicon-on-insulator) patterning and etching process followed by deposition of 0.5 micron Aluminum Nitride (AlN) to form piezoelectric layer to form the transducers. The transducers are numerically modeled using COMSOL Multiphysics software in order to optimize the performance before manufacturing. The electrometrical characterization experiments are presented. The efficiency of the proposed PMUTs compared to the conventional transducers in terms of power consumption, weight and sensitivity and their application in real time weld monitoring is demonstrated.

142. Khan, Altaf and Royston, Thomas

Finite Element Based Optimization of Human Fingertip Optical Elastography

Graduate / Professional - Mechanical and Industrial Engineering
Dynamic elastography methods attempt to quantitatively map soft tissue viscoelastic properties. Application to the fingertip, relevant to medical diagnostics and to improving tactile interfaces, is a novel and challenging application, given the small target size. In this feasibility study, an annular actuator placed on the surface of the fingertip and driven harmonically at multiple frequencies sequentially creates geometrically focused surface waves. These surface wave propagation patterns are measured using scanning laser Doppler vibrometry. Reconstruction (the inverse problem) is performed in order to estimate fingertip soft tissue viscoelastic properties. The study identifies limitations of an analytical approach and introduces an optimization approach that utilizes a finite element model. Measurement at multiple frequencies reveals limitations of an assumption of homogeneity of material properties. Identified shear viscoelastic properties increase significantly as frequency increases and the depth of penetration of the surface wave is reduced, indicating that the fingertip is significantly stiffer near its surface.

143. Khan, Safia and Fritschi, Cynthia

Impact of a 12-Week Walking Program on Diabetes Distress, Depression, and Symptoms of Fatigue in Women with Type 2 Diabetes

Undergraduate - Biobehavioral Health Science

Proper management of diabetes can be difficult and lead to symptoms of distress and depression in diabetic patients. However, physical activity has been found to alleviate such symptoms in non-diabetic populations. We hypothesized that a 12-week walking program would result in improved diabetes distress, depression, and symptoms of fatigue in women with Type 2 Diabetes. We performed a secondary analysis of data from a pilot study about the effects of walking on inflammation and fatigue in aging women with Type 2 diabetes. An experimental pre-post design was conducted on the effect of increasing physical activity on diabetes distress symptoms, fatigue, and depression in a sample of sedentary, aging women with Type 2 diabetes. Psychological data (diabetes distress, fatigue symptoms, depression) and exercise capacity (six-minute walk distance) were collected at baseline and after a supervised, 12-week treadmill walking program to amass 150 minutes of moderate-intensity exercise per week. Thus, the aim of this study was to determine the effects of increasing physical activity on self-report of distress, depression, and fatigue in the sample at baseline and after 12 weeks. Results showed seven women completed the 12-week program (age 60 ± 4.1 years, 87% non-white, BMI 35.3 ± 7.8). After 12 weeks of walking, 6MWD increased by 39.3 meters (p = 0.009), depression levels were unchanged, diabetes distress decreased (p = 0.045), fatigue symptoms improved, although not significantly (p=0.08). Findings from this study suggest increasing physical activity in diabetics will potentially decrease symptoms of distress and fatigue, and may lead to better diabetes self-care, however further research is required.
144. Kim, Andrea

Development of Virtual Reality Applications in Anatomical Education of the Hand and Forearm

Graduate / Professional - Biobehavioral Health Science

Mastery of human anatomy establishes competency in the clinical setting both as medical students and long after graduation from a medical institution. Yet, less time is being spent teaching human anatomy now than ever before, creating educational challenges in current medical curricula. Pursuing new methods and technologies for robust anatomical instruction provide creative solutions to the demand for refining today’s medical education. As interactivity and concurrent visual feedback has largely been reported to be effective in learning complex structures and preventing cognitive overload in perceiving spatial information, investigation of Virtual Reality (VR) educational tools will be beneficial for providing engaging ways in learning and visualizing anatomy. The Virtual Reality Anatomy (ViRA) project addresses the potential of mixed modes of feedback in the framework of visual and embodied learning using VR headsets with the Leap Motion Controller, a tracker that detects motion of the hand, finger, wrist, and forearm. This project explores the development and design of ViRA’s interactive application, with a focus on tracking the user’s physical anatomy and concurrently superimposing virtual musculoskeletal structures with the correct scale, position, and orientation to the user in real-time. Unity3D, an interactive game engine, will primarily be used for the development of ViRA. Once developed, at least 15 healthy volunteers at the University of Illinois at Chicago will be asked to evaluate ViRA and complete a post-assessment survey. As virtual and mixed learning environments have many theoretical and experimental applications to research in the domain of biocommunication and visualization, ViRA’s exploration will provide contributions to feedback strategies for multi-modal learning theories. This study also has the potential to provide new information on the integration between environment, individuals, and technology, carrying research to new conceptual frameworks and experimental approaches.

145. Kim, EunByoel

Silver (Ag) and Gold (Au) Nanoparticles Synthesis for Optimization the Signals in High Performance Surface Enhanced Raman Spectroscopy

Undergraduate - Chemistry

Vibrational spectroscopy is a useful technique to determine the identity of unknown substances. Surface-Enhanced Raman Spectroscopy (SERS) is a highly sensitive vibrational spectroscopy that allows the detection of low-concentration substances which are not able to be detected in normal Raman spectroscopy due to extremely weak signals. The current project in Dr. Jiang’s group is to optimize the signals in SERS to observe vibrational spectroscopy at the single molecule detection limit. The optimization process is necessary to get the signal intensity strong enough to measure vibrational modes of the unknown materials with low concentrations. The nanoparticles used for SERS substrates are varied by size and shape as these parameters are
known to affect the Raman enhancement properties. First, plasmonic metal nanoparticles are synthesized. Plasmonic metal nanoparticles can enhance collected Raman signal by factors of 108. Then, Transmission Electron Microscopy (TEM) is used to determine the nanoparticle structures. The relationship between the structure of particles and intensity of signals is studied. The purpose of this project is to synthesize plasmonic metal nanoparticles to be used as the substrates in SERS. The desired UV/Vis absorbances of silver (Ag) and gold (Au) nanoparticles are at 561 nm and 633 nm, respectively. Silver (Ag) and gold (Au) nanoparticles were synthesized and characterized by UV/Vis spectroscopy. The UV/Vis absorbances of Ag and Au nanoparticles were detected at 420 nm and 525 nm, respectively. These nanoparticles were smaller than desired size of nanoparticles. Based on these results, appropriate methods are continuously investigated to produce different sizes and shapes of plasmonic metal nanoparticles at desired wavelengths of UV/Vis absorbances for further research.

146. Kittle, Haley

**Academic Experience of Division I Athletes in Pre-Health Fields**

*Undergraduate - Biochemistry*

This research was aimed at determining the positive and negative experiences that student-athletes at UIC pursuing a pre-health profession have. Student-athletes were interviewed and asked to fill out a demographic questionnaire. It was found that the athletes believed the positives that they experience out-weigh the negative implications of balancing a difficult schedule with the time-demands of being an athlete. Although the experience of all student-athletes are different, common themes of time-management, relationships with teammates, and the ability to utilize resources provided by academic and athletic departments were common themes. It was also found that all these athletes came into college knowing that they wanted to pursue their respective pre-health fields. The goal is to use this research to enhance the experience of this group of students so that they may succeed in their endeavors athletically and academically.

147. Knopp, Rachel; Ben Aissa, Manel; Lee, Sue; Jastaniah, Ammar; Izar, Ragda and Thatcher, Gregory R.J.

**Selective Calpain versus Calpain/Cathepsin-B Dual Inhibition as a Therapeutic Approach to AD**

*Graduate / Professional - Medicinal Chemistry and Pharmacognosy*

It has been hypothesized that the imbalance or over-activation of cysteine proteases (notably cathepsins and calpains) contributes to neurodegenerative progression. Specifically, hyper-activation of calpain-1 (CAPN1), a modulary cysteine protease, has been implicated in the early pathogenesis of Alzheimer’s Disease (AD), traumatic brain injury (TBI), and ischemic stroke. Prolonged CAPN1 over-activation indirectly permeabilizes lysosomes, leading to release of cathepsin B (CTSB), a lysosomal cysteine-protease implicated in neurodegeneration. Several
reports propose CAPN1 and CTSB as therapeutic targets in AD and TBI, but do not unambiguously provide evidence for a desired strategy, and selectivity for inhibition of CAPN1 over CTSB has been the goal of the most developed program in pharma. We hypothesize dual CAPN1/CTSB inhibition will afford superior efficacy in AD and TBI over selective inhibition. We have identified selective and dual inhibitors and established enzyme inhibition and neuroprotective profiles in neuronal cells using Oxygen Glucose Deprivation (OGD), an in vitro model simulating ischemia-reperfusion injury in stroke. All inhibitors were differentially neuroprotective against OGD-induced cell death, depending on the treatment paradigm (pretreatment, ischemia, and reperfusion). Monitoring spectrin breakdown products (CAPN1-specific) identified different pathways of neuronal death with varying neuro-insults. Additional in vitro models using chemical insults were utilized to monitor CAPN1/CTSB substrates with roles in neuroplasticity/neurodegeneration via immunoblots. After establishing the selectivity of inhibitors for CAPN1 and CTSB, monitoring of peptide substrate proteolysis confirmed inhibitory effects in neuronal cultures, and allowed selection of inhibitors for further study in vivo. Next we aim to test these in a mouse model of mTBI manifesting cognitive deficit and cytokine surge, monitoring behavioral and biochemical changes.

148. Knowles, Katherine; Marchese, Enza; Prabhu, Ramya; Jara, Stephanie; Barbaro, Barbara and Oberholzer, José

**Is the Solution Part of the Problem?: Does Incubation in UW solution actually preserve Islet Integrity During the Islet Isolation Process?**

*Undergraduate - Biological Sciences*

Type 1 diabetes accounts for 5% of diabetes cases and is an autoimmune disorder in which the body’s immune system attacks its own insulin-producing β-cells, reducing the uptake of sugar from the bloodstream.1, 2, 3 Pancreatic islet transplantation has recently been investigated as a possible cure for Type 1 diabetes.5 The UIC Protocol for Islet Transplantation is one such transplant method, where islets in the purification step are incubated in University of Wisconsin (UW) solution and then separated from pancreatic exocrine tissue using COBE 2991 cell separator.10, 11 The COBE machine can only process 45 mL of digested tissue per 1hr cycle. Thus, islet isolations larger than 45 mL must be split into two smaller batches; the COBE 1 batch is processed immediately while COBE 2 incubates in 4°C UW solution. This study compares COBE 1 and 2 islet quality in terms of morphology and cell type distribution within isolated islets to determine if the 1hr waiting period and type of cold storage solution used affects the quality of isolated islets. Samples of isolated islets in both COBE 1 and COBE 2 from (n=3) separate isolations using UW solution and (n=3) Optiprep solution isolations were processed using histological techniques, then stained with a morphological (H&E) stain and immunofluorescence stain for insulin (β-cells), glucagon (α-cells), and somatostatin (δ-cells). Morphological stains were assessed for nuclear pyknosis, nuclear fragmentation, eosinophilia, vacuolization, central necrosis, peripheral fragmentation, and size. The proportions of hormone (+) cell types (α, β, δ) were counted in immunofluorescent stains. In isolations using UW
solution, it was found that COBE 2 islets had, on average, worse morphological scores and lower proportions of hormone (+) cells. For Optiprep isolations, it was observed that COBE 2 isolations had better morphological scores overall and higher proportions of hormone (+) cells on average.

149. Konkapaka, Sindhu; Condren, Alanna and Sanchez, Laura

**Chemical interactions between zebrafish native gut bacteria and Vibrio cholerae**

*Undergraduate - Medicinal Chemistry and Pharmacognosy*

V. cholerae is the bacterium which causes the disease cholera, and has plagued human civilization for centuries, resulting in high mortality rates. To study this ongoing epidemic of V. cholerae infection, zebrafish are a recently described model organism for studying infection. A contributing factor to the use of zebrafish as a model is the fact that zebrafish are indigenous to the freshwaters of countries surrounding the Indian ocean where cholera is seasonally endemic. We therefore aim to explore the interactions between the cultivatable zebrafish gut microbiota and Vibrio cholerae. In order to accomplish this, we are building a diverse library of cultivable microbes from zebrafish intestines using protein and small molecule profiles of the zebrafish microbiota with the goal of building a library for future cholera competition studies. To identify the different types of bacteria native to the zebrafish intestinal microbiome and the unique chemistry which they produce, zebrafish were sacrificed and their intestinal microbes were cultivated. To analyze the small molecule and protein production from the over 100-strain library, matrix assisted laser desorption/ionization time-of-flight imaging mass spectrometry (MALDI-TOF IMS) is used. Using IDBac, a bioinformatics technique which correlates samples based on their protein and small molecule mass spectrometry profiles, a phylogenetic tree of the zebrafish gut microbe library is created. Based on this phylogeny tree, strains which produce unique chemistry will proceed through bioassay testing to determine if the native gut bacteria of the zebrafish have antibiotic or biofilm inhibition properties towards V. cholerae.


150. Kooy, Christopher

**The Norwegian Model of Peace Promotion and Conflict Resolution: Sources, Origins, and Outcomes**

*Undergraduate - Political Science*
In this project, I will research domestic determinants of Norway’s approach to foreign policy and peace promotion, and the arrival of Norway as a ‘peace-promoting country’ and the development of a ‘Norwegian model’ for conflict resolution processes. A literature review will be used to gather material related to the topics covered, and I will inductively argue a liberal interpretation of international relations with regard to Norway’s foreign policy approach. I will specifically look at the history of the country, instances of peace promotion abroad, national political culture and the Gandhian philosophy of peace apparent in mainstream Norwegian political thought (Krøver 92), perceived national interests, and popular labor and social movements related to Norway or countries it has been involved with in peace processes and human rights promotion. I will also consider realist and other perspectives of Norway’s foreign policy and criticisms of its peace programs and model to appraise opposing views to the argument. I hope to discover to what extent these factors are determinants of Norway’s foreign policy approach (if at all) and if so, to what extent they have manifested in Norway’s history of peace promotion and involvement in conflict resolution, particularly in Latin America.

151. Koshy, Daniel; Gallik, Kristin; Navales, Fritz; Govinda Rajan, Sriivatsan and Saxena, Ankur

Involvement of Wnt Signaling in Neural Crest Cell Migration into the Olfactory Epithelium

Undergraduate - Biological Sciences

Neural crest cells (NCCs) are highly migratory stem cells that become various cell types and tissues in developing vertebrate embryos such as melanocytes, craniofacial cartilage, and the entire enteric nervous system. More recently, it was found that in zebrafish, NCCs also form microvillous olfactory sensory neurons (mOSNs), one of the two main types of sensory neurons in the nose, but little is known as to how these NCCs migrate into the olfactory epithelium (OE). Using chromogenic in situ hybridization, we found expression of Fzd8a – a receptor of Wnt ligands – in the OE from 20-28 hours post-fertilization (hpf), when NCCs are surrounding and migrating into the OE suggesting Wnt signaling could be involved in this developmental process. Due to the critical role Wnt signaling plays in early neural crest development, we used temporally specific approaches by treating embryos with pharmacological agents that inhibited/activated Wnt signaling from 24-31 hpf and imaged them using confocal microscopy at 54 hpf. Canonical Wnt inhibition with IWR-1 lead to a greater number of NCCs within the OE. General Wnt inhibition with IWP-2 lead to fewer NCCs within the OE. Canonical Wnt activation with 6-BIO lead to a large reduction of NCCs within the OE. To continue our investigation in a more genetically specific manner, we used heat shock transgenic lines to either inhibit or activate canonical Wnt signaling by inducing the transgenic at 22 hpf and imaging the embryos at 54 hpf. Canonical Wnt inhibition did not yield a significant change in the number of NCCs within the OE. Canonical Wnt activation phenocopied the 6-BIO experiments leading to a decrease in the number of NCCs within the OE. While our data suggests Wnt signaling may be involved in NCC ingestion, future experiments with greater spatial specificity are required to further elucidate this role.
Developmental Maturation of Central Visual Synapses is Impaired in a Mouse Model of Infantile Neuronal Ceroid Lipofuscinosis

Graduate / Professional - Anatomy and Cell Biology

Neural circuits are sculpted by the interplay between synapse formation, maintenance, and refinement. Protein palmitoylation is the reversible attachment of palmitic acid to proteins. In neurons, this posttranslational mechanism is critical for axon pathfinding, synaptic transmission, and plasticity. Depalmitoylation, the process of palmitic acid removal, is required for lysosomal proteolysis. Mutation of the depalmitoylating enzyme, palmitoyl-protein thioesterase 1 (PPT1), causes infantile neuronal ceroid lipofuscinosis (CLN1), a pediatric neurodegenerative disease characterized by visual deterioration and seizure, leading to death by five years. However, the role of protein depalmitoylation in neural circuit formation is unknown. Further, it is unclear how loss of PPT1 function leads to synaptic dysregulation and neurodegeneration in CLN1.

Therefore, we examined the Ppt1-/- mouse to decipher the role of protein depalmitoylation in visual cortex (VC) maturation. First, in primary cortical cultures, Ppt1-/- neurons exhibited morphologically immature dendritic protrusions, including filipodia and elongated, thin spines. Calcium imaging experiments revealed extrasynaptic Ca2+ transients in dendritic shafts of Ppt1-/- neurons, while wild-type (WT) cells had compartmentalized Ca2+ influx within spines. Next, we conducted biochemical analyses of synaptosomes prepared from VCs of developing (postnatal day 11-60), WT and Ppt1-/- mice. Ppt1-/- VCs had selective decreases in mature components of the N-methyl-D-aspartate receptor (NMDAR) protein complex, the GluN2A subunit and its scaffolding protein, PSD-95, which increase during development. In contrast, neonatal components of the NMDAR complex, GluN2B and SAP102, were unchanged. Recording of NMDAR-mediated excitatory postsynaptic currents (EPSCs) in layer II/III VC neurons confirmed a reduction in both the amplitude and decay time of the fast, GluN2A-mediated component of the EPSC in Ppt1-/- VC. Lastly, Ppt1-/- neurons demonstrate increased vulnerability to NMDA-induced excitotoxicity, which is corrected by palmitoylation inhibitors. Together, these findings suggest a critical role for PPT1 in NMDAR regulation and synapse maturation during development.

On the Use of Gentamicin-Collagen Sponge (GCS) to Reduce the Risk of Surgical Site Infection (SSI) in Patients Undergoing Elective Colorectal Surgery.

Undergraduate - Epidemiology and Biostatistics

Surgical site infections (SSI) are the most common healthcare-associated infection, and the highest rate of SSI occurs in patients that have undergone colorectal surgery. This is because colorectal surgery is performed on a part of the body (gastrointestinal / perineal) that is densely
populated by microorganisms. Additionally, surgical site infections contribute to billions in direct medical costs in the United States. Therefore, it is highly desirable to investigate and implement methods that may reduce the risk of SSI in patients undergoing colorectal surgery. Topical antimicrobial methods present an innovative solution for reducing the risk of SSI in colorectal surgery: the local delivery of antimicrobial agents to the surgical site. A variety of methods have emerged over the fifty years, varying in mechanisms of delivery and antimicrobial action. The authors performed a systematic review on the use of topical methods in colorectal surgery. One of the investigated methods is the Gentamicin-Collagen Sponge (GCS) - a sponge impregnated with gentamicin (antibiotic). GCS delivers a high concentration of antibiotic to the site and the collagen is slowly absorbed by the body 1-8 weeks after surgery. This method is ideal, as it delivers a high concentration of antibiotics to a single site and it does not need to be removed from the body. However, the small number \((n < 10)\) of published studies in which GCS is implemented in patients undergoing colorectal surgery posed the author with a question: when a systematic review is conducted on an intervention on which a limited number of studies is available \((n < 10)\), what conclusions can be made regarding the method? Statistical methods typically performed in systematic reviews are also studied within this context.

154. Krishna, Arthi

**Diversity and Richness of Lichens in Selected Forest Types of Sri Lanka**

*Undergraduate - Botany - Field Museum*

A lichen presents itself as a unique organism; it is not a single organism, but a composite made up of two or more organisms who live together symbiotically. Each lichen is comprised of a dominant mycobiont and a photobiont. The mycobiont is formed by a filamentous fungus - an organism incapable of forming its own food and functions as a decomposer. The photobiont is either comprised of green algae or a cyanobacterium (or in some cases both). The fungal filaments are interwoven among the algal cells presenting a unique mutualistic combination. This extreme form of symbiosis results in a body that can withstand environments of extreme temperatures, humidity, and light. Lichens can colonize almost any setting as long as they are provided with appropriate amounts of light, moisture, air, and freedom from competition. As such, the topical, island nation of Sri Lanka’s unique geography and topology has allowed for a “hotspot” of lichen biodiversity. Overall, Sri Lanka’s mountainous, warm, and wet climate provides a suitable environment for these families. Consequently, when analyzing a sample collection of Sri Lankan lichens (collected from December 2014 - April 2015), it is hypothesized that the montane and rainforest regions will contain the greatest levels of diversity and richness. Each collected lichen was categorized into a specific region, these regions then underwent analysis for their Shannon Diversity, Richness, and Evenness through SPSS statistical software. The main purpose of this project is to document the biodiversity of Sri Lanka before further environmental damage harms the local lichen population. By classifying and categorizing these samples now, we can better understand which regions to watch and preserve, and how to better protect these lichens.
Autophagy is an evolutionarily conserved catabolic process in which cytosolic content is engulfed, degraded in lysosomes, and recycled. This process is critical to maintain cellular homeostasis and has been implicated in numerous diseases, including neurodegenerative diseases such as Niemann Pick disease type C1 (NPC1). In this disease, cholesterol accumulates in neurons ultimately leading to neuronal cell death. Our goal is to discover small-molecule modulators of autophagy to study this pathway in the context of NPC1 and to determine if autophagy activation could help prevent cholesterol accumulation and rescue neuronal cells. A high-throughput screen was performed using a GFP-LC3 HeLa cell line to identify small molecules that activate autophagy. A GFP-mCherry-LC3 dual reporter HeLa cell line was used to validate molecules as late stage inhibitors or true activators. A promising molecule has been discovered that activates autophagy without long-term toxicity (72 h). A synthetic route was developed to access this molecule and currently analogues are being synthesized to develop structure activity relationships and to produce molecules with higher potency. These molecules will then be evaluated in models of NPC1 to better understand the role of autophagy in this disease.

Flavonoid, Delphinidin Chloride abrogates the Effect of C. difficile Toxin B on Barrier Function in Intestinal Epithelial Caco2 Cells.

Background: Clostridium difficile (C. difficile) is a gram-positive spore forming bacterium that causes antibiotic associated diarrhea. C. difficile mainly secretes cytotoxin, TcdA and TcdB which can cause Clostridium difficile infection (CDI). However, the cause for toxin-induced diarrhea remains unknown. Moreover, decreased barrier function and increased epithelial permeability are known to contribute to the pathophysiology of diarrhea caused by CDI. In this regard, Delphinidin chloride (DC), a flavonoid found in a wide variety of berries has been shown to be anti-inflammatory as it protects against TNF induced loss of barrier function in intestinal, epithelial Caco-2 cells. However, whether DC can alter C. difficile toxin induced decrease in barrier function in caco2 cells is not known. Aim: This study was performed to determine if DC could increase the barrier function in intestinal epithelial cells both under normal and C. difficile induced conditions. Methods: the Study was performed in caco-2 cells grown on 12 well transwells plate. The cells were treated with DC in presence or absence of TcdB for 24 hours. Transepithelial resistance (TEER) was measured using a Volt Ohm Meter as a functional readout of intestinal epithelial barrier function. Results: Our data suggests that DC (50 µm) for 24 h
increased TEER in Caco-2 cell monolayers. Moreover, TcdB decreased TEER in the Caco2 cell monolayer as compared to untreated control. Interestingly, this decrease was abrogated in the presence of DC. Conclusion: Our study suggests that delphinidin chloride could be used as an effective agent in reducing the effects of Clostridium difficile induced infection where epithelial integrity is compromised.

157. Kurdieh, Zade; Katherine E. Zink and Laura M. Sanchez*  
Visualizing the chemical exchange via small molecules that encourages symbiotic relationships between microbes and their hosts  
Undergraduate - Medicinal Chemistry and Pharmacognosy  
The Hawaiian bobtail squid (Euprymna scolopes) has developed a lifelong symbiotic relationship with a bioluminescent bacterial species, Vibrio fischeri. V. fischeri inhabits the light organ of the squid and, in return, the bacteria effectively counter-illumines the surrounding waters allowing the squid to hide its silhouette, thus camouflaging it from predators. Forward genetics and mass spectrometry will be utilized to link colonization phenotypes to the small molecules that may be producing these phenotypes. We hypothesize that metabolites exchanged between V.fischeri and E. scolopes dictate the colonization of the light organ epithelium and regulate the life-long symbiosis. We utilize our transposon library which involves insertions into the genome of V. fischeri, disrupting a non essential gene and influencing secondary metabolite production, and thus, colonization ability and biofilm production. Mutants have different biofilm morphology and I plan to investigate effectively two mutants of V. fischeri against the wild type. The ΔbinK mutant is a strong squid colonizer, with a silenced biofilm inhibitor kinase (binK) producing wrinkled biofilms that indicate overproduction. Our other mutant, rscS is a weak squid colonizer and, because of a silenced rscS (regulator of symbiotic colonization sensor) has a smooth colony phenotype, indicating underproduction. Using imaging mass spectrometry (IMS) we have been able to visualize the masses of metabolites within bacterial colonies based on their mass-to-charge ratios (m/z) and have detected significant differences between colonization capabilities. Our current research, with mass-driven hypotheses, will focus on elucidating metabolites and their function in biofilm production.

158. Kuzma, Anna  
Education of Cervical Radiculopathy for Young Adults  
Undergraduate – Biological Sciences  
Art and design have an impactful presence on people and are a powerful tool when implemented in education. High school students respond positively to artistic visual tools alongside information being taught. To stimulate interest in kinesiological studies, I created and assembled information on a specific neurological condition, cervical radiculopathy (CR). Pairing information about CR along with interesting, anatomic visuals amongst a pleasant design can
promote education in multiple ways. First, it can draw the audience’s attention, and help keep the reader interested. Also, the use of graphics can better illustrate an idea to a student, more clearly than a paragraph may be able to. A visually appealing presentation of information can make the reader feel more connected to the topic, drawing their interest in. Given this, the educator has the ability to engage students in gaining more in-depth information to further the students’ progress (and possibly aid them in the great search of “what-do-I-want-to-be-when-I-grow-up”). Using the educational tool with anatomic art that I created for young adults, I presented this information to high school students, with a positive response. Students interest in the medical field or the arts were discussed following the presentation.

159. Lay, Taylor; Roy, Amanda L.and Villasanta, Samatha L.;

**Educational aspirations of urban youth: Conceptualizations of Success Post-high School**

*Undergraduate - Psychology*

Ongoing discourse surrounding urban youth and post-high school education is of much interest. Scholars have identified challenges that impede urban students' access to higher education (e.g., poor academic preparation, students' difficulties navigating the college enrollment process, and poor understanding of financial aid systems). Despite this fact, youth of color do have high educational aspirations as evidenced by findings from survey research. However, we know less about how urban youth discuss success post-high school and the steps they take to achieve their goals. Therefore, this mixed-methods study may help bridge understanding about discrepancies between youths' access and aspirations.

To address this gap, I pose the following research questions:

1. What are the themes that emerge when low-income, racial/ethnic minority youth are asked to describe why learning is important to them?

2. Do these themes vary by gender, race/ethnicity, and household income?

This study uses qualitative data from a sample of 216 predominantly racial/ethnic minority, low-income youth between the ages of 13 and 17 living in Chicago. Youth were originally recruited into the study as part of a socioemotional intervention trial implemented in Chicago Head Start preschool programs between 2004 and 2006. In the most recent round of data collection (which took place in 2016), youth were asked an open-ended question, "Why is learning important to your goals?" This question was coded to explore patterns in the ways youth conceptualize learning and relate classroom-based learning to their future aspirations. An iterative, collaborative process was used to thematically code and analyze responses. Initial themes have emerged including: wanting to achieve financial success and desire to make a larger world difference. In a second set of analyses, we will consider whether response categories vary by participant demographics, specifically youth gender, race/ethnicity, and family income. Implications for intervention and future research suggestions will be shared.
**160. Le, Mitchell and Mai, Lananh**

**Characterization of a Tetrahyemna thermophila Protein Involved in the Initiation of Mating**

*Undergraduate - Biological Sciences*

In unicellular organisms, the process of identifying a mate, called conjugation, is important for the cell. We are interested in the initial genes that are upregulated during the initiation of conjugation in the model ciliate Tetrahymena thermophilia. To identify this subset of genes, we searched the Tetrahymena Functional Genomic Database and identified a number of genes that fit this criterion. One of these genes, TThERM_00891190, showed homology to the AP2 subunit complex beta and WD domains. Since these domains have been shown to be involved in vesicle formation and pheromone release, we decided to study this uncharacterized gene. Our initial approach to determine the function of the protein encoded by this gene was to generate both a green fluorescent protein (GFP) and yellow fluorescent protein (YFP) gene fusion. The localization of the GFP and the YFP fusions will allow an initial insight into the protein’s function. Gene specific primers were generated and the gene was amplified via PCR. The PCR product was cloned into an entry vector which was then verified by sequence analysis. These entry clones were used to transfer the gene sequence into expression vectors to create an N-terminal GFP and C-terminal YFP gene fusion. Once the fusion constructs were verified, we transformed these constructs into Tetrahymena cells. We are currently screening for transformants and once transformants are obtained, we will induce expression of the gene fusion and localize the fusion protein by fluorescent microscopy. We hypothesize that initial localization will appear on vesicles at the Golgi apparatus and eventually dock along the plasma membrane. These transformed cells can serve as tools in studying the initiation of conjugation.

**161. Lee, Christopher**

**Underground Marketplaces and Hacker Forums; Dark net communities and their place in today’s technological and social landscape**

*Undergraduate - Information and Decision Sciences*

Being part of a strong community has been the centerpiece of survival through all of history. From tribalism to nationalism, at the core of every geo-centric ideology is pride in one’s own community. With the advent of the internet, these communities have done away with physical borders and have brought together groups of people with similar ideas and lifestyles. As communities foster smaller sub-communities, oftentimes, these groups consist of the elite of their class or the most “devoted” to the culture. These sub groups garnish even more pride and strength in bonds between members. Within the online sphere, the most infamous groups exist in the dark web. I focus my research on two groups of dark net communities: the underground marketplace and the hacker forum. My analysis included gathering various details of five examples of each, each example unique in the sphere in which they operate. I bring all of this
together in an analysis of what these communities represent, if and why their growth is culturally important, and what this may mean in the global scale.

162. Lee, Sue; Ben Aissa, Manel; Wang, Yue-ting; Nepomuceno, Emily; Gonzalez, David and Thatcher, Gregory R.J.

**Novel Model of Accelerated Cognitive Deficits Induced by Oxidative Stress and Traumatic Brain Injury with Exacerbated Neuropathology**

*Graduate / Professional - Medicinal Chemistry and Pharmacognosy*

Recent reports have linked traumatic brain injury (TBI) ranging from sports athlete’s concussions to soldier blast impacts to earlier onset dementia. However, the link between mild trauma and its role in the ability to deplete a person’s “cognitive reserve” as they age leading to dementia is still unknown. Any advances in early identification tools, understanding sequela mechanism, and therapies for TBI would have significant socioeconomic and health care implications. To address this, we have developed an oxidative stress induced mouse model (Aldh2-/-), demonstrating aging-like pathology, in conjunction with a closed head weight drop injury model to mimic cognitive deficits and neuroinflammatory pathology that occurs post mild TBI. Our primary objective is to identify functional damage and future consequences induced by mTBI that contribute to increased risk of dementia. In the Aldh2-/- mice where oxidative stress (OS) represents a “1st hit”, Aldh2-/- mice exhibited increased levels of OS and accelerated cognitive deficits as early as 3 months. We further characterized this model using a chemoproteomic approach to identify a network of differentially expressed proteins linked to accelerated cognitive decline. More interestingly, when a “2nd hit” was administered such as mTBI, it led to an exacerbation of neuroinflammatory surge and post concussive syndrome 24 hrs post injury and sustained deficits in behavior up to 1 month. To utilize this model, we tested a novel library of small molecules that reactivate CREB through NO/cGMP signaling that have been previously evaluated for its anti-inflammatory, anti-convulsant, and pro-cognitive properties. Our results demonstrated a reversal of post-concussive syndrome, decrease in inflammation, and additional alleviated damage from other contributors of mTBI. This novel model of mTBI on a background strain of aging (Aldh2-/-) allows us to develop a preclinical model where disease modifying strategies for TBI can be tested.

163. Lemke, Noah and Molumby, Alan

**Occlusion of Faunal Succession on Sus domesticus Carrion: Is James Woodworth (Peacock) Prairie's Decomposer Guild Depauperate?**

*Undergraduate - Biological Sciences*

Many species of insects are necrophagous and their attraction to carrion occurs in a relatively predictable successional pattern (Rivers & Dahlem, 2014). Notably, blowflies (Diptera: Calliphoridae spp.), are the first species to be attracted to carrion (Byrd & Castner, 2010).
eggs grow and develop into a ‘maggot mass’ which facilitates the arrival of further conspecifics (Byrd & Castner, 2010). Then, other Dipterans (flies) and Coleopterans (beetles), come to predate or parasitize the growing maggot mass or one another (Byrd & Castner, 2010). Ultimately, the collective actions of this guild, e.g. the organisms that all exploit carrion as a resource (Simberloff & Dayan, 1991), push the carrion through five stages of decomposition (Rivers & Dahlem, 2014), until only a skeleton remains. In order to evaluate whether James Woodworth (Peacock) Prairie (a tallgrass prairie fractured within the larger urban environment of Cook County, IL) was depauperate of a decomposer guild, a pig’s head (Sus scrofa domesticus) was allowed to decompose in an area of disturbed mesic prairie. However, the head mummified before a maggot mass formed, likely due to predatory actions of an autochthonous ant population (Hymenoptera: Formicidae spp.), which occluded key the early successional species (Rivers & Dahlem, 2014) from colonizing the head and attracting latter successional species. Therefore, the study’s hypothesis could neither be supported or refuted.


164. Lemoine, Agnieszka and Jalowiec, Katarzyna

Interprofessional Collaboration: UIC Students' Understanding of the Health Informatician Role

Undergraduate - Health Information Management

Health Informatics (HI) is the science of defining how health information is captured and utilized for the advancement of medicine, combining IT, computer science and healthcare (UIC 2018). HI is essential to interprofessional collaboration (IPC) in healthcare; patient care activities rely on coordination surrounding patients’ health information (Belz et al 2015). The World Health Organization (2010) defines interprofessional education (IPE) as when two or more professions learn about, from, and with each other to enable effective collaboration and improve health. What level of understanding do other health professions have of HI as part of the interprofessional healthcare team? To examine this larger question, our research analyzed perceived understanding of the Health Informatician role among students in UIC Health Science Colleges by program designation and race. Data were collected via Qualtrics survey of students participating in UIC’s IPE Immersion Day education experience during 2013-2017. N=2403 responses to the questions examined. IBM SPSS 24 was used to conduct ANOVA (confidence level 95%, alpha 0.05). A 0-4.0 scale measured respondents’ understanding of the Health Informatician role (0=no understanding, 4=full understanding). Levene’s test for unequal variances indicated statistical
difference in mean understanding of the Health Informatician role by student program designation (p=0.00) and by race (p=0.037). Results for students in eight UIC Health Science Colleges by program (excluding HI) indicated mean understanding of the Health Informatician role below 2.0 except for Public Health/Administration (M=2.00) and HIM (M=2.38). Given these results and the importance of health information, increased participation in UIC IPE curricular initiatives is recommended for the UIC HI program as online opportunities become available. Although results for students by race were significant, unequal sample sizes (White 49.3%, Black 7.7%) could have affected this analysis; further research recommended. Note: Researchers collaborated with HIM students Patel and De Los Reyes in examining this data set.

165. Lewandowski, Cutler; BenAissa, Manel; Lee, Sue; Karumudi, Bhargava and Thatcher, Gregory

**Development of Tissue-Selective ABCA1 Agonists as Potential Therapeutics for Alzheimer’s Disease**

*Graduate / Professional - Medicinal Chemistry and Pharmacognosy*

Apolipoprotein E (APOE) ε4 allele is the strongest risk factor for sporadic Alzheimer's disease (AD). Lipoproteins containing ApoE4 have lower lipid content, which decreases stability and contributes to loss of lipoprotein function. To correct these deficits, we have developed tissue selective ABCA1 agonists (TSAAGs) that induce central nervous system expression of cholesterol transporter ABCA1, thereby increasing lipid content of apoE4 containing lipoproteins, with minimal impact on peripheral lipogenesis. High throughput screening (HTS) utilized luciferase reporter elements expressed by CCF-STTG1 astrocytoma cells (primary screen) and HepG2 hepatocellular carcinoma cells (counterscreen) linked to ABCA1 and SREBP1c promoters, respectively, to identify several hits, which have since been validated by concentration response assay following repurchase. Priority hits, which showed antiinflammatory and insulin sensitizing properties in addition to TSAAg activity, served as scaffolds to synthesize a library of novel structural analogs. In vitro evaluation of this analog library via luciferase assay, PCR, and fluorescent cholesterol efflux measurements established structure activity relationships to identify compounds with improved TSAAg activity and guide further structural modification. The results demonstrate a proof of concept to develop TSAAGs with multifunctional therapeutic potential for Alzheimer’s disease. Future in vivo experiments in healthy mice will establish pharmacokinetic profiles, determine magnitude of tissue selective ABCA1 induction, and monitor alterations in peripheral lipogenesis. Finally, treatment in EFAD mouse model will assess TSAAg effect on cognitive and pathological deficits. Our study represents a novel strategy to develop small molecule drug candidates that target multiple aspects of AD pathology, which would ultimately serve as leads for further pharmaceutical development and human clinical testing.
166. Librizzi, Rachel and Burkett, Candice

The Role of Presentation Format in the Detection of Multi-representational Discrepancies in Science Texts

Undergraduate - Psychology

Academic science texts are regularly assigned to high school and college level students in order to advance their knowledge of the topic they are learning. Previous research by Otero and Kintsch (1992) and Stadtler, Scharrer, Brummernhenrich and Bromme (2013) has explored the ability of participants to detect discrepancies within academic texts and has shown that many of the participants either failed to detect the discrepancy or they attempted to reconcile the discrepancy by explaining it away. Stadtler, et al., (2013) found increased memory for, and integration of, conflicting information in text when readers were presented with information in multiple documents compared to information in single documents. As an extension, the current study investigated notice of discrepancies between two texts and between text and graph when information was presented as one document compared to multiple documents. In this study, 138 undergraduate students read and interpreted documents about antibiotic resistance. We manipulated whether participants saw discrepant or consistent information and whether or not the documents were presented as a single source or multiple sources. Once they looked over the sources, participants were asked to answer forced-choice (yes/no) and open-ended, short-answer questions to gauge their understanding of the documents – specifically whether or not they detected a discrepancy, and if so how they interpreted it. In accordance with prior research, we predicted greater memory for the information containing a discrepancy when the discrepancy was present and when the documents were presented as multiple sources. ANOVA Results indicate that participants were equally likely to verify having seen information whether it was discrepant or consistent F(1, 135) = 0.68, n.s. or whether information was presented as a single or as multiple documents, F(1, 135) = 1.78, n.s. Coded open-ended responses indicated differences in the way students interpreted discrepant information presented in text and graph.

167. Longos, Kathleen and Balcazar, Fabricio

Barriers and Facilitators to Success for Entrepreneurs with Disabilities

Undergraduate - Psychology

Historically, individuals with disabilities face more adversity in finding a job and job promotion than their able-bodied counterparts. As a result, disabled individuals experience significantly greater rates of unemployment than non-disabled individuals. A review of empirical research suggests that entrepreneurship can provide a viable alternative to traditional employment for disabled individuals. The Artfully Gifted Foundation (AGF) is a non-profit dedicated to the success of entrepreneurs with severe physical and intellectual disabilities. In order to maximize its effectiveness, the AGF must address the distinct factors that enable or hinder success for their entrepreneurs. This paper will first review the previous research on barriers and facilitators to entrepreneurship for individuals with disabilities. The review findings will then be used to create
and administer a survey to current disabled entrepreneurs at the AGF. The results should identify both some of the supports and challenges experienced by the starting entrepreneurs. After analyzing the results of the survey, I plan to make some recommendations regarding services and/or supports that may help participants remove some of the barriers to their entrepreneurial success.

168. Loos, Anastasiya

The Effect of Cannabis Use on Learning and Memory in Mature Naked Mole Rats

Undergraduate - Neuroscience

Naked mole rats (NMR) are long-lived small mammals that possess an extended period of adolescence for their size, meaning they more closely resemble human adolescent development than other rodents. Currently, society is concerned with the long-term cognitive deficits frequent cannabis use could bring to adolescent humans, especially how cannabis use will affect learning and memory in premature humans. Meanwhile, adolescent NMRs have a developmental system structurally similar to human adolescents. Our preliminary findings indicated that mature NMRs do not exhibit motor function deficits after cannabinoid receptor activation. Therefore, we questioned how cannabis would affect cognitive function in NMRs due to their unique functional changes upon reaching maturity. We hypothesized that cannabinoid application in young adult NMRs would not cause cognitive impairment compared with control NMRs, a stark contrast to the impairment that we predicted for adolescent 4-month-old NMRs in a concurrent project. We examined the effects of synthetic cannabinoid use on NMRs’ cognition, specifically maze learning and memory retention, using Hebb Williams Mazes by comparing both the time it took to complete the mazes and the number of mistakes made, to determine if cognitive functioning was impaired following treatment with cannabis. Some variation was found in between the control and treated subjects of both animals during the “difficult” mazes. Furthermore, while the mice were affected under cannabis influence, NMRs were only slightly affected. However, within both animal groups, animals performed slightly worse when treated with cannabis compared with the controls. In conclusion, we have only begun our study, so we have not yet obtained comparison data. It may be to our lab’s benefit to try different concentrations of the synthetic cannabis in the future to see if this could affect our data in any way.

169. Lopez, Brianda

Best Practices for All-Inclusive Sex Education Programs

Undergraduate - Applied Psychology

Lesbian, gay, bisexual, transgender, queer and questioning (LGBTQ) youth communities have struggled to get equal representation throughout education spectrums. Many schools fail to implement school curriculum that recognizes the identities, experiences, and needs of LGBTQ youth. The need for all-inclusive LGBTQ education can be seen more specifically in sex
education programs. Sex education programs have revealed positive outcomes and proven to be a beneficial reliable source of information when well-designed and well-implemented. Results demonstrate a decrease in sexual risk behaviors and an increase in positive sexual health relationships and outcomes. For LGBTQ youth to obtain the same advantages these programs provide, sex education should be LGBTQ-inclusive. The purpose of this literature review is to focus on sex education programs that have recognized the need for LGBTQ-inclusiveness and proven to demonstrate their effectiveness. LGBTQ-inclusive sex education programs would not only help the youth understand sex through medical information but also in defining and understanding gender identity and sexual orientation. Inclusive programs embrace positive representations of LGBTQ individuals and their relationships with other individuals, families, and significant others. It challenges the common stereotypes within the LGBTQ community and focuses on the need these programs have to reduce sexually risk behavior for all individuals and their identities as a whole.

170. Loukenas, Efstatia; York, Jason; Hansen, Allison; Balu, Deebika; Valencia-Olvera, Ana and LaDu, Mary Jo

**The effect of aging on APOE-modulated AD pathology in EFAD mice**

*Undergraduate - Anatomy and Cell Biology*

The greatest risk factor for Alzheimer's disease (AD) is age, while the APOE4 allele is the greatest genetic risk factor compared to common APOE3 and rare APOE2. APOE4 is associated with the accelerated accumulation of the peptide amyloid-β (Aβ), which can aggregate to form both amyloid plaques and small soluble aggregates or oligomeric Aβ (oAβ), the latter considered a proximal neurotoxin. Using our novel EFAD transgenic (Tg) mice (expressing human apoE and overexpressing human Aβ42), we previously demonstrated that in EFAD brains apoE lipidation is lower and soluble Aβ levels are higher in APOE4 vs. APOE3. This reduction in lipidation would cause apoE4-lipoproteins in the CNS to be unstable, consistent with the reduced levels of apoE4 vs. apoE3 in the brains of humans and APOE-Tg mice. As soluble Aβ associates with lipoproteins to facilitate its clearance, with apoE4-lipoproteins, soluble Aβ levels would be greater in APOE4 vs. APOE3. Thus, we developed the mechanistic hypothesis that AD pathology and APOE4 cause a reduction in apoE lipidation, inefficient clearance of soluble Aβ, with eventual synaptic loss, memory/cognitive deficits, and dementia. By 6 months (M), E4FAD mice have greater cognitive impairment, AD pathology (amyloid deposition) and soluble Aβ levels, with lower apoE lipidation levels compared to E3FAD. However, aging has not been analyzed beyond 6M. Our results demonstrate that at 8-, 10-, 14-, and 18M of age, E4FAD mice have increased AD pathology, decreased apoE lipidation, and increased levels of soluble Aβ compared to E3FAD and E2FAD, demonstrating the continued development of APOE-modulated AD pathology. Cognitive impairment also increased with age but only at 18M was there an APOE genotype effect. These results support the hypothesis that, compared to apoE3- and apoE2-lipoproteins, the lipidation of apoE4-lipoproteins continues to decrease as age and AD pathology increase providing a target for APOE4-driven therapeutic approaches.
171. Majumdar, Shreyan

**Magnetic Resonance Elastography in a Mouse Model of Alzheimer's Disease: 5XFAD**

*Graduate / Professional - Bioengineering*

Alzheimer’s disease (AD) is the most widespread form of dementia. Magnetic Resonance Elastography (MRE) is a Magnetic Resonance Imaging (MRI) based technique, where vibrations are externally induced into soft tissue to assess their shear stiffness. MRE has been demonstrated to be sensitive to the advanced stages of the disease. The goal of the research is to show the early diagnostic potential of MRE for Alzheimer’s disease. MRE experiments on the 5XFAD Alzheimer’s disease (AD) mouse model were conducted at the 9.4T pre-clinical MRI scanner at the Research Resources Center of the University of Illinois at Chicago. A vibrating bite bar type actuator was used to induce mechanical shear waves in the mouse brain. The AD and Control mice were in the age group of ~1 month (n = 2 for both) and 3~4 months (n = 5 for both). Median stiffness values were measured over different regions of the brain. The overall brain tissue was stiffer in the disease model when compared to the control, with results being significant at the 3–4-month time point. Further experiments are underway at the 1-month time-point for conclusive age-based comparisons.

172. Malkana, Usama; Treffy, Randall W.; Nacke, Lynne; Bergey, Dani; Santana, Dianicha; O'Bryan, John and Saxena, Ankur

**Microenvironment-Induced Differentiation of Neuroblastoma: A Possible Explanation for its Rare Presentation in the Head**

*Undergraduate - Biological Sciences*

Neuroblastoma (NB) is the most common cancer found in the first year of human life, and its etiology is poorly understood. NB is thought to be derived from neural crest cells (NCCs), highly migratory, pluripotent stem cells that are responsible for the formation of several different cell types including neurons, melanocytes, and facial bones. Despite NCCs contributing extensively to the head during embryonic development, NB seldomly presents there, with most primary tumors developing in sympathetic nerve tissues localized to the abdomen, thorax, and pelvis. To investigate this disparity, human NB cells were xenotransplanted into the craniofacial microenvironment of the developing zebrafish embryo and live-imaged using confocal microscopy. Co-migration among human NB cells and zebrafish NCCs was observed. NB cells placed in microenvironments in contact with or directly adjacent to the developing eye migrated anteriorly and subsequently appeared to differentiate into neurons, while NB cells placed posterior to this region did not differentiate. The roles of intersectin-1 (ITSN1; a tumorigenic protein) and all-trans retinoic acid (ATRA; a common treatment for patients diagnosed with NB) in NB migratory and differentiating behavior were also investigated. ITSN1-silenced NB cells displayed a stark decrease in migratory and differentiating behaviors, whereas ITSN-expressing
control and ITSN1-silenced, ATRA-treated NB cells displayed differentiating behaviors regardless of their microenvironment. Our novel in vivo model suggests that differing microenvironments within the developing vertebrate embryo play a pivotal role in the progression of NB, providing a possible explanation for its rare presentation in the head along with demonstrating the importance of ITSN1 in NB tumorigenesis and the therapeutic, differentiating properties of ATRA.

173. Martinez, Lydia

An Examination of the PASS Program’s Effects on Families Living in Urban Poverty and the Role of SFLs in Empowering Parents Enrolled in the PASS Program.

Undergraduate - Psychology

The purpose of this study is to examine the PASS Program’s effect on families living in urban poverty. Both parents and PASS Program staff (referred to as School Family Liaisons/SFLs) were recruited to participate in the study in order to gather information from both service recipients and providers. This goal of this study is to summarize parents’ report of the services they received and what aspects of these services were most important to them. In addition, this study will examine the role that SFLs play in empowering parents in the PASS program.

174. Metwally, Ahmed; Ferkol, Thomas; Dai, Yang; Finn, Patricia and Perkins, David

Longitudinal Computational Microbiomics Methods: Identification, Modeling, and Classification in a Pediatric Lung Transplant Cohort

Graduate / Professional - Bioengineering

Complications after lung transplant are common despite advancements in organ preservation, surgical techniques, and allograft surveillance. For children, a vulnerable population, the 5 and 10-year survival for lung transplants are only 52% and 29%, respectively. Infections are the most common cause of mortality (>30% of deaths) after transplantation. Understanding the role of the microbiome in transplantation is crucial in improving outcomes. In terms of microbiome characterization, methods achieving high precision can lack sensitivity in some applications, and vice versa. As for longitudinal studies, only identifying differential features between two phenotypes does not provide sufficient information to determine whether a change in the relative abundance is short-term or continuous. However, accurate assessment of how the microbiome changes over time is a powerful approach to classify the contribution of the microbiome to disease states and progression. Using pediatric lung transplantation as an example, we developed computational methods that help improve on both characterization and longitudinal microbiome analysis approaches. We have been able to (1) classify the microbial sequences with both high precision and high sensitivity using “WEVOTE”, (2) identify time intervals of differentially abundant microbial features in longitudinal studies using “MetaLonDA”. Using these algorithms, we were able to identify microbiome dynamics that can be suggestive of pediatric lung transplant
rejection, insights that can be leveraged to improve lung transplant outcomes. Moreover, we developed a novel convolutional neural networks (CNN) learning architecture that effectively exploits phylogenetic structure in microbial taxa for phenotype prediction.

175. Miller, Christina

**PC-CHIP: Improving Quality of Life in Advanced Prostate Cancer Patients**

*Undergraduate - Biological Sciences*

Prostate cancer is one of the most common types of prostate cancers among men, while it does have a generally high survival rate. Because older men, defined as older than 50 years old in this study, typically suffer from advanced prostate cancer (APC), they also experience potential stress from their life situation. Such stress about their condition, the effects of their treatment, prostate specific antigen (PSA) levels, pain, as well as stress about the future, productivity, and even fears of death can significantly alter immune and inflammatory mechanisms, as well as psychological and physical responses. Overall, these stressors are said to affect one’s health-related quality of life (HRQOL). It is pertinent for APC patients to learn stress management techniques to better manage physical and psychological symptoms, immune and inflammatory responses, as well as disease activity. The participants in this study are men over the age of 50 years who have been diagnosed with localized or advanced prostate cancer. Intervention was delivered via a group-based video-phone application, with 10 weekly meetings discussing various aspects of stress and stress management. The control group for the study also participated in 10 weekly meetings through the same application, however discussions were about general health and wellness, with no emphasis on stress management. Data collected included psychosocial self-report questionnaires about cancer acceptance and action (AAQ) and body mass index (BMI). Analysis of the data suggests that APC participants began the study with higher anxiety levels than localized cancer participants. Compared to that of localized participants receiving intervention, APC participants showed a steep drop in anxiety levels immediately after the termination of intervention that was sustained 12 months post baseline. Such conclusions could suggest the improvement in APC patients’ HRQOL with the implementation of stress management techniques.

176. Milman, Eleanor; Alemseged, Zeresenay; Brennan, Kevin; Lebowicz, Leah and Daugherty, John.

**Creating an animation to depict a juvenile Australopithecus afarensis specimen: Implications for functional foot anatomy**

*Graduate / Professional - Biomedical and Health Information Sciences*

One of the best documented species in the human fossil record is Australopithecus afarensis. Because infant and juvenile skeletal remains are more fragile than those of adults, they are less likely to preserve well, and their remains are far less common. The 3.3 mya Dikika fossil has
been described as a pivotal discovery in paleoanthropology representing some of the oldest remains of an early hominin child. The development and application of accurate, high-quality reconstruction techniques, such as three-dimensional (3D) modeling and animation, help clarify differing interpretations of the fossil record. 3D animation is an especially useful tool in evaluating hypotheses that pertain to functional anatomy because of its ability to clarify and elucidate verbal analyses of morphology, to educate, and to facilitate further research. This investigation develops a methodology to use biomedical visualization techniques in reconstructing paleoanthropological specimens. A 3D animation was created that depicts the taphonomy and foot anatomy of the juvenile Australopithecus afarensis specimen popularly known as “Selam” or “The Dikika Child.” This visualization may help researchers understand subtle features that characterize the history of human locomotion.

177. Mohammed, Aasiya

**Optogenetics**

*Undergraduate - Liberal Arts and Sciences*

Optogenetics is a scientific technique which can be used to study neurons and the neural networks they form inside the brain. It is a method that combines biotechnology and genetics in order to control the behavior of cells in living tissues. Light is used to control the activation or inactivation of specific neuronal connections. The speed and precision of this technique has enabled it to open several doors to studying the function of neuronal networks and their role in healthy and diseased organisms.

178. Moody, Dyese; Cohen, Lorna and Lynch, Jeremy

**Evolution and Development of Head Morphology in Closely Related Wasps**

*Undergraduate - Biological Sciences*

Morphological development of complex traits depends on the interactions between multiple alleles at several loci, commonly known as epistasis. One of the most complex traits is perhaps the metazoan head as many tissue types must develop synchronously, making head development ideal to study epistasis. Serious defects can arise from a disruption among any of these interactions. The goal of this study is to explore expression and function of candidate head development genes found in the parasitoid wasp model, Nasonia, that have been well studied in Drosophila. Nasonia are beneficial in epistatic studies because they are more basal in the evolutionary tree. Nasonia also have haplodiploid genetics, where males are always haploid. This aids in epistatic studies by removing dominance effects, as all males will be fully hemizygous. For this particular study, we examined two closely related species: Nasonia vitripennis and Nasonia giraulti because of slight differences in the shape of the adult head. Understanding their early patterning and development is substantial to unfolding the epistatic interactions that contribute to head morphology and species differences. RNA interference (RNAi) was
performed by injecting double stranded RNA into Nasonia larvae for targeted knockdown of selected genes. Genes known to govern eye-antennal disc development were knocked down and developmental repercussions were analyzed with microscopic imaging. In situ hybridization (ISH) was used to locate regions of gene expression in the developing eye-antennal disc over time. The expression of genes selected in the study had been successfully located with ISH, and RNAi results are currently being analyzed. For example, RNAi on doublesex indicates it functions in developing shape of the head capsule in N. giraulti. Current knowledge of epistatic interactions can be furthered through these studies, which will contribute to discern the manner developmental disorders arise.

179. Morales, Carmen and Robert, Yann

The Disappearance of French Revolutionary Drama

Undergraduate - French and Francophone Studies

While many scholars have studied the controversial theater that emerged with the French Revolution, characterized by transparent satires of public figures and topical issues and serving as a forum for political debate, often resulting in violent conflict, propaganda and anxiety, none have studied its disappearance. Who was responsible for the end of Revolutionary drama? Why did this type of theater disappear at the start of the nineteenth century? To answer these questions, I studied and translated twelve pamphlets located in the archives at the Newberry Library and consisting of transcriptions of speeches made by deputies of the two principal legislative assemblies, the Conseil des Anciens and the Conseil des Cinq-Cents. I contend that this previously overlooked 1797 debate, motivated by the collective desire to amend the law of January 13, 1971, which had put an end to censorship and led to the multiplication of theaters in Paris from three to several dozens, contributed to the disappearance of Revolutionary drama. During their speech, each deputy stated their opinion on three recurring issues, related to the morality, censorship, and ideal number of theaters. I found that there were differences of opinion on each issue, not only between the two legislative assemblies, but also within their deputies. While the debates suggest an answer to the question of why this type of drama disappeared, they do not lead to a concrete answer to my first question: who was responsible for the disappearance of French Revolutionary theater? Further research shows that in 1807 Napoleon Bonaparte, having become emperor and replaced the Directory, put into effect the proposals discussed ten years earlier during the 1797 debates and thus is responsible for the disappearance of theaters that acted as forums for political debate.

180. Myat, Aye; Tamas, Timothy J.; Covington, James; Khurana, Rohan; Vadatian, Masha and Radosevich. James A.

Head & Neck Squamous Cell Carcinomas (SCC) Adapted to High Levels of Nitric Oxide Show Down-Regulation of Cadherin-1, Type-1 (CDH1)
Hypothesis: Exposing SCC cancer cells to high levels of nitric oxide (NO) will result in down-regulation of genes coding for proteins involved in cell adhesion, thus increasing metastatic potential. Objectives: Patients with high levels of NO have lower survival rates compared to those with lower levels of NO. Moreover, it has been shown that exposure to high levels of NO results in increased potential for metastasis. A key step in the progression of metastasis is the modification of cell adhesion. To further study the observed increase in metastatic potential, four oral SCC cell lines have been adapted to high levels of NO (HNO cancer cells). When comparing the expression of genes, CDH1 was found to be down-regulated in the HNO cancer cells of all four oral SCC cell lines. CDH1 codes E-Cadherin, which plays an important role in cellular adhesion. Methods: 4 oral SCC cell lines were studied: SCC016, SCC040, SCC056, and SCC114. The cell lines were adapted to high levels of NO by using the NO donor DETA NONOate. Afterwards, DNA microarrays were used to compare gene expression between the HNO and parent cell lines. Results: CDH1 was consistently down-regulated in the HNO cancer cells of the four SCC cell lines studied. Conclusions: Exposure to high levels of NO results in a down-regulation of the CDH1 gene in all four SCC cell lines. Loss of E-Cadherin gene expression needs to be further explored at the protein and cell surface levels. The HNO cells have properties that are highly metastatic. Expression levels of CDH1 in the presence and absence of NO may also be helpful in understanding the impact of CDH1 on metastatic potential.

181. Nepomuceno, Emily; Gonzalez, David; Lee, Sue; Ben Aissa, Manel and Thatcher, Gregory R.J. Overview of Concussion and Mild Traumatic Brain Injury (mTBI) Safety in the NHL and the Behavioral Characterization of a Novel Model for mTBI for the Utilization as a Preclinical Model for mTBI

Recent reports have correlated mild traumatic brain injury (mTBI) to increased risk of developing dementia, neurological deficits, and chronic traumatic encephalopathy (CTE). This study will have two main aims: first, in high risk sports such as ice hockey, it is important to investigate current modes of prevention of mTBI through game play policies, concussion safety protocols, and protective equipment as well as future solutions. Second, to study the long-term neurological effects of mTBI and its connection with aging and to test novel therapies for mTBI, we can use animal models such as the Aldh2/-/- mouse model to supplement clinical research of aging and mTBI. This model focuses on the effects of oxidative stress (OS), implicated in mTBI, aging, neurodegeneration, and dementia. Aldh2/-/- mice lack the major detoxifying enzyme for 4HNE (a product of lipid peroxidation, caused by OS). The model is characterized behaviorally through hippocampal-dependent learning and memory tasks including novel object recognition. Cognition deficits are seen in the knockout mice as early as 3.5 months, plateauing around 6 months. 4-HNE was understood to play a role in cognitive deficits in the Aldh2/-/- mice when confirmed using a 4-HNE scavenger. Therefore, we propose to utilize the Aldh2/-/- mouse model of accelerated cognitive impairment and aging as a model for mTBI in the presence of existing conditions.
pathology with the addition of a “2nd hit” event implemented through a closed head free weight drop model to induce mTBI. This work includes multiple paradigms of single and repetitive mTBI to mimic concussions and sports related injuries in humans so that the mechanisms linking mTBI with early onset dementia can be studied. Additionally, novel drug therapies are implemented at different timepoints post mTBI to study their therapeutic windows.

182. Nguyen, Kim; Malone, Margaret and Brown, Joel

**Quantifying Neogobius melanostomus Predation Risk to Great Lakes Predators Through Food Patches**

*Undergraduate - Biological Sciences*

Invasive species can proliferate in non-native regions without a natural predator to regulate the population. The round goby Neogobius melanostomus was introduced to North America in 1990 from the Black Sea to the Laurentian Great Lakes via ballast water. Since its introduction, these fish have been reaching sexual maturity up to a year earlier and reproducing rapidly, displacing local fish from their natural environment through resource competition. Although the widespread abundance of N. melanostomus provides many species with a food source, little is known about the perceived predation risk of N. melanostomus to Great Lakes predators. Predation risk was quantified through experimental food patches, where the giving up density (GUD) was the point at which the forager determined that it was no longer energetically favorable to eat from the patch. The quitting harvest rate (H) was calculated through $H = C + P + MOC$, where foraging behavior incorporated metabolic cost (C), predation cost (P), and the missed opportunity cost of choosing to forage instead of partaking in other activities (MOC). Comparing deviations in GUD’s of N. melanostomus alone, N. melanostomus with a typical predator in Lake Michigan (the smallmouth bass, Micropterus dolomieu), and N. melanostomus with a fish that poses no predatory threat (the white sucker, Catostomus commersonii) revealed patterns of behavior that influence its interactions with local fish. The Wilcoxon signed-rank test was used to show that there was no statistically significant difference in the GUD’s of these trials. Observations and video analysis to study the fear responses of N. melanostomus allowed for a better understanding of their behavioral interactions with native predators, potentially providing a new angle for regulating the round goby population in Lake Michigan.

183. Nguyen, Tho

**OSMAC- A Solution for Antibiotics Resistance Crisis**

*Undergraduate - Biological Sciences*

Since the discovery of penicillin in 1928, microorganisms have served as a significant source of therapeutic drugs. However, a major problem with discovery efforts is the rediscovery of known compounds. What if some biologically active compounds produced by microorganisms are overlooked because the genes encoding them may be silent or not expressed in laboratory
conditions? In the current study, we grew 37 different strains of Micromonospora in six different types of media. We hypothesized that the same strain can produce different types of bioactive compounds as antibiotics against pathogen Bacillus subtilis by altering the ingredients of the media to trigger different biological compounds to be produced by our panel of microorganisms. A high-throughput bioassay is set up using an agar overlay method on a multi-well culture plate. When Micromonospora strains are tested against B. subtilis, the resulting zone of inhibition will be analyzed using MALDI-TOF-MS (Matrix Assisted Laser Desorption/Ionization- Time-of-Flight Mass spectrometry). 3 strains were found to inhibit the growth of B. subtilis on different types of media. Further works will focus on identifying the structures of the compounds produced by these 3 strains using extraction and isolation, MALDI, and NMR spectroscopy. Due to the development of drug resistance by a variety of microorganisms, it is necessary to discover new lead compounds to fill the discovery pipeline. Manipulating the growth environments of microorganisms could be a useful method because a single strain of bacteria can potentially produce numerous of antibiotic compounds by turning on its cryptic pathways.

184. Nieto, Antonio; Mishra, Atreya; Stamos, Tom; Gerber, Ben and Kitsiou, Spyros

Mobile Health Technology Use Among Patients with Chronic Heart Failure: Survey Study

Heart failure (HF) is a chronic condition affecting approximately 6.5 million people in the United States. Over half of the patients admitted to the hospital for HF-related reasons will be readmitted within 6 months of discharge. Patient adherence to HF self-care strategies reduce their likelihood of hospital readmissions and improve their health. Unfortunately, self-care among HF patients is typically poor. Smartphone technology used in combination with health devices (mHealth) offers an innovative opportunity for addressing the complex requirements of HF self-care. However, little is known about HF patients’ use of mobile technology, specifically for the self-management of their condition and if usage varies across demographics. The three primary objectives of this study were to: (a) assess the adoption and use of smartphones and mHealth technologies by chronic heart failure patients, (b) examine the attitudes and perceptions of patients towards the use of mHealth technologies for self-management of HF, and (c) examine variations of mHealth usage across demographics. We conducted a single sight, cross-sectional survey of 100 heart failure patients, all of whom were adults and able to speak and read English or Spanish. Survey participants were administered a questionnaire which focused on the following main themes: (a) smartphone ownership and use, (b) ownership of other mobile devices and health technologies, (c) intention to use mHealth technologies for self-management of heart failure, (d) demographics. 100 of 144 eligible patients agreed to participate in the study, most of whom were female and African American. 68% of heart failure patients owned a smartphone. Age, education, employment status, and income were strong predictors of smartphone ownership among participants. 62% of participants were interested in using mHealth technologies, however, only 15% used apps to self-monitor their health. The results suggest that mHealth technologies can be used to deliver a self-management intervention to HF patients.
185. **Nighoghosian, Helaneh; Madhavan, Sangeetha; Sivaramakrishan, Anjali and Iyer, Pooja**

**Participation Satisfaction for Non-Invasive Brain Stimulation and Walking Training in Stroke Survivors**

*Undergraduate - Kinesiology and Nutrition*

Previous studies have demonstrated the significance of non-invasive brain stimulation therapies to enhance neural plasticity and improve recovery in stroke survivors. One of the major techniques being studied includes transcranial direct current stimulation (tDCS). In tDCS, electrodes send weak currents with either an inhibitory or excitatory response of the brain’s cortex. The Brain Plasticity Lab (BPL) has been studying these therapies and their effects in an attempt to improve the walking ability in stroke survivors. Additionally, a high-intensity treadmill training complements the brain stimulation methods to measure and assess how these therapies will affect walking in individuals with stroke. Ultimately, it is the objective that these non-invasive methods be implemented into a clinical rehabilitation setting; however, the degree to which participants find the stimulation and training satisfactory is a major factor determining whether such methods will be successful in a clinical setting. Participant satisfaction is an important element to assess when determining to implement innovative technologies in clinical environments such as repetitive transcranial magnetic stimulation (rTMS) and tDCS. The purpose of this study was to observe and analyze participant satisfaction with the brain stimulation therapies and trainings used in the BPL as a way to determine possible future success with these therapies clinically. It appears most participants have positive experiences in the lab and are very satisfied with the brain stimulation therapies and training they received. These findings are significant for determining whether such methods will be successful in a clinical rehabilitation setting and to ultimately help individuals who have suffered a stroke to improve their walking ability and regain their independence.

186. **Obanor, Winifred**

**The Role of Nutrition and Physical Activity on Academic Performance.**

*Undergraduate - Public Health*

According to the Centers for Disease Control and Prevention (CDC), nearly one in five school-aged children (ages 6–19) in the United States are obese (CDC, 2017). More specifically, nearly 30% of boys and girls under age 20 are either obese or overweight - a 19% increase since 1980 (IHME, n.d). In recent studies, obesity has been shown to be a determinant of not only adverse health outcomes, but also poorer educational achievement. The purpose of this study was to investigate the unique impacts that nutrition and physical activity initiatives have on student academic performance. First, a literature review was conducted to assess this relationship. Next, a cross-sectional study of Coordinated School Health (CSH) programs and policies implemented
in a sample of rural Illinois schools was analyzed to determine these relationships. School-based programs and policies were based upon the wellness-policy provisions recommended by the Illinois Department of Public Health. The literature review indicated that allocating an additional hour of daily extra-curricular time to physical activity (PA) may result in improved fitness, concentration, classroom behavior, cognitive performance, and ultimately higher-Grade Point Averages (GPAs). Findings from the CSH study showed varied increases in academic achievement when nutrition and physical-activity policies and programs were implemented. Overall, school-based nutrition and physical-activity initiatives are needed on a consistent basis to promote student progress and improve a child’s learning and health.

187. Ocegueda, Feliciano

**Examining the Potential Safety and Housing Impacts of an Urban Bicycle Trail on Chicago’s Northwest Side**

*Undergraduate - Public Health (Undergraduate)*

Background: Increased levels of cycling in Chicago have prompted the construction of new bike infrastructure, including the development of “rails-to-trails” projects. The Weber Spur, a rail-to-trail project located on Chicago’s Northwest Side, has the potential to serve as a bolster to the public health of residents. While still in the planning phase, it is critical to examine the potential safety and economic impacts of the trail, as well as how these concerns may fall in line with the concerns of residents. Purpose: To determine the potential for public health benefits and drawbacks associated with the Weber Spur Trail within the institutional, community, and policy levels of the socio-ecological model. Methods: Examination of the potential for bicycle crash reduction was examined through a hot-spot analysis of crashes within a mile radius of the Weber Spur. Data on bicycle crashes for the years 2013-2015 were collected from the Illinois Department of Transportation and analysis was conducted using the mapping software ArcGIS. Demographics and home values were accessed through the American Community Survey 5-year estimates for the years 2007-2011 and 2012-2016. This study focused on comparing the rising home values of the 606 trail, another prominent rail-to-trail project, with home values around a half mile radius of the Weber Spur. This provided a basis for understanding the effect of trail development on housing costs and determining whether the potential for home displacement exist with the Weber Spur. Results: In progress.

188. O’Neil, Stephanie; Maizels, Evelyn; Brennan, Kevin; Thaxton, C. Shad; McMahon, Kaylin and Young MA, Christine

**Comparing Visual Communication Methods of a Synthetic HDL Nanoparticle’s Structure and Function**

*Graduate / Professional - Biomedical and Health Information Sciences*
This research project compares different methods of presenting a novel application of nanomedicine with intentionally created visuals. The structure, function, and potential therapeutic use of a synthetic biomimetic of high density lipoprotein (HDL AuNP) was visualized as a 3D animation and series of still images used in a presentation. This nanoparticle is unique in its ability to mimic the size, shape, and surface chemistry of native HDL. Like native HDL, the HDL AuNP binds to scavenger receptor type B1 (SR-B1). Malignant B-cells are shown to highly express SR-B1 in order to meet their increased metabolic need for cholesterol. Therefore, the HDL AuNP can target kill these cells by starving the malignant B-cell of cholesterol. This project is made in collaboration with the developers of this structures, Dr. Shad Thaxton and colleagues at Northwestern University’s Fienberg School of Medicine. Three methods of scientific presentation were compared: a standard PowerPoint with bulleted lists and pre-existing images, an assertion evidence presentation with a sentence summary and created didactic images, and a presentation with an animation. Study objectives include ascertaining best practices for incorporating text and visuals, both static and dynamic, into scientific presentations given to medical school students, and comparing scores of recall, recognition, and transfer of each presentation type. Results of pre and post tests from the three groups were compared to determine knowledge transfer, feedback on learning preferences, perceived confidence in the material, and opinions of the visuals presented were collected through Likert scale questions.

Osafo, Neil; Sottoriva, Kilian and Zhen, Zhenguo

Elucidating the Role of Deltex 1 in T-cell Acute Lymphoblastic Leukemia

Undergraduate - Biological Sciences

Notch signaling is a key evolutionary pathway important for mammalian development. However, gain-of-function mutations within the pathway often lead to abnormal growth associated with cancer. T-cell lymphoblastic leukemia (T-ALL) is an aggressive form of leukemia that primarily affects the developing T-cells. In the context of Notch signaling, Notch receptors are mutated in over 60% of all T-ALL cases. The mutations cause hyperactivate Notch receptor signaling, leading to uncontrolled T-cell growth. Prior work has shown Deltex-1 to be a downstream target of Notch signaling in developing T-cells. However, the role of Deltex-1 in the context of T-ALL has yet to be investigated. Here, we are performing a variety of genetic and molecular studies to investigate the role of Deltex1 in murine and human T-ALL. qPCR was utilized to validate Deltex-1 as a Notch target gene. A suitable short hairpin RNA (shRNA) was designed to target Deltex-1 for knockdown in T-ALL cells. Western blot assay was subsequently used to determine protein expression levels. Screening leukemic T-cells, we detected 60% of T-ALL cells suppressed the expression of Deltex-1. In a murine T-ALL cell line (T6E), we detected decreased expression as well as a truncated version of Deltex-1 by western blot assay. These results indicate that there is a possible alternative protein coding sequence which leukemic cells employ to limit the function of Deltex-1.
Prevalence of Hypertension in Nigerian Regions

*Undergraduate - Liberal Arts and Sciences*

Hypertension, also known as high blood pressure, is a global public health concern affecting millions of people. Normal blood pressure is less than 120/80 mm Hg, borderline high blood pressure is between 120/80 mm Hg and 140/90 mm Hg, and high blood pressure is 140/90 mm Hg and higher. Stress and irregular exercise are known factors of hypertension. Based on literature, High Prevalence and Low Awareness of Hypertension in a Market Population in Enugu, Nigeria and Blood pressure, hypertension and correlates in urbanized workers in Ibadan, Nigeria: a revisit, many cities in Nigeria showed differences when it came to indicating which gender had a higher rate of hypertension. Low awareness of hypertension and low doctor to patient ratios in regions of Nigeria could be significant factors in the prevalence of high blood pressure. The purpose of this study was to examine the prevalence of hypertension in two regions of Nigeria. Nursing assessments were conducted as part of the Funmi Adewole Foundation’s mission trip to two cities in Nigeria, Ibadan and Akufo, in 2016. The high blood pressure criteria used during the mission trip was that a BP of 140/90 mm Hg or higher was hypertension, and a hypertension evaluation was performed on individuals from 20 to 99 years old. In Akufo, the prevalence of hypertension was 16.77% (n= 638). 15.20% of men (n=250) and 17.78% women (n=388) had hypertension there. Hypertension in Ibadan was significantly higher at 29.20% (n=685). 22.12% of men (n=208) and 33.26% of women (n=463) had high blood pressure. Hypertension evaluations were not performed in Ibadan for individuals with no specified gender (n=14). We compared prevalence rates for males and females, hypothesizing that more females than males would have hypertension in Nigeria, which could be due to males being more reluctant than females to visit health clinics.

Cristae Align Across Multiple Mitochondrial Membranes in Vestibular Hair Cells to Possibly Increase ATP Output

*Undergraduate - Neuroscience*

The main objective of this research is to study mitochondria in inner ear hair cells from a functional and structural perspective. Mitochondria are divided into three different sub-types, according to size: large, medium, and small. Our focus is mitochondria near the cuticular plate (CP) in vestibular Type 1 hair cells. Since these mitochondria are adjacent to the CP, we also see stereociliary rootlets (SRs) in close proximity. In addition, we hypothesized that the side facing the CP has a significantly larger amount of cristae junctions (CJs) compared to the opposite side in order to satisfy energy demand of rapidly regenerating SRs. This suggests a polarization of CJs towards one side, so that they can transport ATP and Ca2+ to points of interest, such as SRs and the CP (Perkins et al. 2010). Using IMOD software created by Univ. of Colorado, we examined and accurately traced individual contours that, when meshed, gave a very detailed
structure of the mitochondria. By counting CJs on either side of the mitochondria, we can determine their density relative to the CP. We also obtained accurate surface area measurements. Interestingly, lamellar cristae in one mitochondrion were seen to curve in the direction of the stereocilia rootlets and three mitochondria were observed to form a type of “super-mitochondrion” by alignment of their CJs and tethering of the outer mitochondrial membranes. Stereocilia are known to construct their actin from tip to base using myosin and rate-regulating proteins (Naoz et al. 2008). We hypothesize that mitochondria provide ATP for reconstitution of actin filaments and for maintaining the structure of the cuticular plate. The alignment of cristae between mitochondria may be able to increase ATP production. In conclusion, our results support the hypothesis that CJs are asymmetrically distributed in favor of structures of interest that require more ATP.

192. Withdrawal

193. Palnitkar, Harish; Lewis, Phillip; Hammersley, Margaret; Shah, Ramille; Royston, Thomas and Klatt, Dieter

**An Investigation of the elRationship between Fiber Spacing and Shapes of Mechanical Shear Waves in Composite Anisotropic Phantoms**

*Graduate / Professional - Mechanical and Industrial Engineering*

The current work is based on the observation that the shear wave fronts in an anisotropic fiber phantom experience scattering at locations where fibers intersect, in addition to an elongation of the wave front along the principal direction of fibers. The investigators propose a mathematical measure called 1-Norm that can be used to describe the extent of scattering. Additionally, the authors propose to use Finite Element Analysis as a tool to decouple the effects of directional anisotropy from those of inhomogeneity through development of finite element models containing repeatable, uniformly spaced spherical inhomogeneities inside a homogeneous and isotropic medium. The investigators observed that the extent of wave scattering, as quantified by 1-Norm, is directly related to the ratio (R) of wavelength of shear waves to the distance between two neighboring inhomogeneities. In the future, 1-Norm may be used as a marker to determine the spatial distribution of cross links in biological tissues such as the skeletal muscle.

194. Pandya, Shan; Burkhouse, Katie and Phan, K. Luan

**Emotional Regulation Strategies as Treatment Predictors for Anxiety and Depression**

*Undergraduate - Psychiatry*

Selective-Serotonin Reuptake Inhibitors (SSRIs) and Cognitive Behavioral Therapy (CBT) are two gold-standard treatments for anxiety and depressive disorders, however heterogeneity is present on the effectiveness of these treatments from patient to patient. Therefore, it is necessary
to search for predictors of treatments for individuals, thus being able to provide treatment most effectively. Cognitive reappraisal and suppression are two forms of emotion regulation that have been linked to both anxiety and depression, and may serve as potential predictors of treatment response. The current project sought to explore this question using a heterogeneous sample of patients with anxiety and depressive disorders. Participants completed self-report and interview based measures of psychopathology, and also the emotional regulation questionnaire. Following the screening appointment, patients were randomized into one of two different treatment conditions, either 12 weeks of SSRIs or 12 weeks of CBT. As per our results, a trend was shown that patients who use less suppression at baseline had a greater reduction in anxiety symptoms with SSRI treatment (p = .08). Moreover, in terms of cognitive reappraisal, there was a significant main effect showing that patients who used more reappraisal at baseline had a higher reduction of depression and anxiety symptoms (p< .05), following both CBT and SSRI treatment. These findings suggest that patients who use less suppression at the beginning of treatment tend to have better outcomes in lowering anxiety symptoms through SSRI treatment. Furthermore, greater use of cognitive reappraisal appears to be beneficial for both anxiety and depressive symptom reduction, regardless of treatment condition. Future research could look at how integrating emotional regulation strategies into treatment can further benefit patients.

195. Paralkar, Shivani; Varas, Gonzalo; Wang, Shuaijie and Bhatt, Tanvi

Adaptation To Real-Life External Environments Using Immersive Virtual Reality: A Pilot Study

Graduate / Professional - Physical Therapy

Purpose: To investigate the effect of virtual environment’s(VE) on gait using a low-cost head mounted Virtual Reality(VR) device. We hypothesized that there would be differences in the spatiotemporal and kinematic gait parameters demonstrated under different VE’s as strategies for effective negotiation in the environment. We also hypothesized to see motor adaptation after repeated exposure to the VE’s. Methods: An 8-camera motion analysis system was used to collect data from 28 reflective markers on 15 young healthy subjects. Subjects walked on a 7m walkway for 4 trials of natural walking (NW) and walking under snowy and crowded VE’s followed by a mixed block of random NW and VE trials. Parameters like Excursion angle(EA-deviation of CoM relative to the sagittal plane); peak excursion of CoM in mediolateral(ML) and anteroposterior(AP) directions, Walking speed(WS) and Step length(SL) were analyzed for each trial. One-Way Repeated-Measures ANOVA was performed with bonferroni post-hoc tests. Results: Compared to NW trials, EA and ML-exc significantly increased on the 1st trial of both VE’s(p<0.05) with decreased WS and SL(p<0.05). EA and ML-exc increased significantly from 1st to 4th snow trials(S4>S1) and decreased in the crowd trials(C4<C1). The acquired motor adaptation was retained even after mix block where there was no difference between S4 and C4 and last trials of the mixed block(S8 and C8). AP-exc was not affected by the snow condition but only crowd with NW<C1;C1<C4 and C8(p<0.05). SL and WS decreased in both VE’s compared to NW, however over trials only snow condition showed significant increase in SL and WS from
S1 to S4 which was maintained at S8. Discussion: Results in healthy young participants demonstrate positive spatiotemporal deviations from baseline gait when immersed in VE’s. In snow condition they adopt cautious gait patterns while in the crowd condition they increase their movement patterns to avoid collisions. In both conditions, however they quickly adapt and restore near normal gait patterns.

196. Patel, Harsh; Dunn, Jeff and Ragozzino, Michael

**Tandospirone, a 5HT1A receptor agonist, attenuates elevated grooming behavior and learning deficit in the Shank3B +/- mouse model of autism**

*Undergraduate - Psychology*

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is broadly characterized by the presence of restricted interests and repetitive behaviors (RRBs), along with deficits in social interaction and communication. The Center for Disease Control and Prevention (CDC) estimates that 1 in every 68 children is diagnosed with ASD. At present, aripiprazole and risperidone (atypical antipsychotics) are the only Food and Drug Administration (FDA)-approved drugs to specifically treat irritability in ASD. These treatments have shown some limited effectiveness in reducing irritability, but also result in significant side effects, e.g. weight gain and sedation. There is a particular need to find treatments for RRBs because compulsive-like stereotypies, circumscribed interests, cognitive rigidity and non-functional routines interfere with and limit daily living for ASD individuals. Mouse models of autism afford an opportunity to explore hypotheses about the underlying neuropathophysiology contributing to ASD features and test possible novel treatments. Shank3 mice provide a useful model for the study of ASD, as haploinsufficiency of the SHANK3 gene is known to cause Phelan-McDermid syndrome, which has a high penetrance of ASD diagnosis. A previous study showed that Shank3 mice exhibit increased repetitive behaviors due to greater cortical excitation. There is evidence that activation of serotonin (5-HT) 1A receptors reduces cortical excitation. There is also evidence that treatment with a partial 5-HT1AR agonist may be effective in alleviating repetitive behaviors, i.e. grooming. In a recent study, we found that tandospirone reduced grooming behavior in male Shank3 mice. Unknown is whether the same treatment would be effective in female Shank3 mice. This project examines whether tandospirone, at various doses, affects grooming behavior in Shank3 heterozygous and wildtype mice, as well as determine whether the treatment has a more general effect on activity.

197. Patel, Kush

**Associations Between School District Policies to Increase Student Participation in Meals and Students' Perceptions of School Lunches**

*Graduate / Professional - Epidemiology and Biostatistics*
Policy measures like those geared towards increasing the strength of school district policy can impact perception of the quality of school meals. The primary objective of this study was to investigate the role of varying levels of school district policy on students’ perceived nutritional value of the school lunches available to them. It was hypothesized that stronger levels of school district policy would reduce the number of students not eating the school lunch because they did not find the school lunch to be nutritious. The data in our analysis were collected for all 2,165 surveyed students in grades 1-12, as part of the USDA’s School Nutrition and Meal Cost Study during the 2014-2015 school year. Students were asked questions about the types of foods they eat, how often they eat at school, and their overall opinions of the school lunches, but the analytic sample for each question varied due to the presence of missing data and skip patterns. It was found that students that were in districts with any form of policy, aimed towards strategies to increase participation in school food programs, had lower odds of reporting that they did not eat school lunches because they were not nutritious than students at schools with no policy or provision (OR=.134, 95% CI: .032,.567). Additionally, there seemed to be a statistically significant (P=.038) gender effect as females had nearly three times higher odds of stating that they did not eat the school lunch because they did not find it nutritious compared to males (OR = 2.60, 95% CI: 1.05, 6.39). However, the joint effect of gender and any policy to test for potential moderation was not significant (P>.05), thus in future research studies, it may be worthwhile to test for moderation in other factors.

198. Patel, Nikita and De Los Reyes, Angelica

Interprofessional Collaboration: UIC Students' Understanding of the Health Information Management Role

Undergraduate - Health Information Management

Health information management (HIM) is the practice of acquiring, analyzing, and protecting health information vital to quality patient care (AHIMA, 2017). HIM is essential to interprofessional collaboration (IPC) in healthcare; activities surrounding patient care rely on coordination surrounding patients' health information (Belz et al 2015). The World Health Organization (2010) defines interprofessional education (IPE) as when two or more professions learn about, from, and with each other to enable effective collaboration and improve health.

What level of understanding do other health professions have of HIM as part of the interprofessional healthcare team? To examine this larger question, our research analyzed perceived understanding of the HIM role among students in UIC Health Science Colleges by program designation (Nursing, Medicine, Pharmacy, Rehabilitation Sciences, Dental Medicine, Public Health Administration, Social Work, Health Informatics) and gender. Data were collected via Qualtrics survey of students participating in UIC's IPE Immersion Day education experience during 2013-2017. N=1950 responses to the questions examined. IBM SPSS was used to conduct ANOVA and independent samples t-tests (confidence level 95%, alpha 0.05). A 0-4.0 scale was used to measure respondents' understanding of the HIM role (0=no understanding, 4=full understanding). Levene's test for unequal variances indicated a statistical difference in mean
understanding of the HIM role by student program designation (p=0.00). There was no significance between understanding of the HIM role and student gender. Results for students in eight UIC Health Science Colleges by program indicated a mean understanding of the HIM role below 2.0 except for Health Informatics (M=2.75) and Public Health/Administration (M=2.04). Given these results and the importance of health information, continued participation in UIC IPE initiatives and increased interprofessional collaboration across the UIC Health Science Colleges are recommended for the UIC HIM program. Note: Researchers collaborated with HIM students Lemoine and Jalowiec in examining this data set.

199. Paz, Melissa

**Evaluation of the Inclusion of People with Dual Diagnosis in the Short-Term Stabilization Program**

*Undergraduate - Biological Sciences*

In the United States, over 35% of people with intellectual and/or developmental disabilities (IDD) have been reported to have co-occurring psychiatric disabilities, which is termed dual diagnosis. This number continues to increase as people with IDD experience a variety of systemic barriers and do not receive the complex and individualized services that they need, putting this population at a higher risk for being institutionalized or re-institutionalized. To provide an alternative to institutionalization for individuals experiencing behavioral crisis, the Illinois Department of Human Services Division of Developmental Disabilities provided funding in 2016 to two Illinois Agencies, Envision Unlimited and Illinois Advocacy Group, to implement four Short-Term Stabilization Homes (SSH) in Illinois. This study examines the inclusion of individuals with dual diagnosis in the planning of their supports and how person-centered planning (PCP) is used as a vehicle to promote inclusion within the SSH program at Envision Unlimited. First, interviews were completed with Envision Unlimited's Division Director and SSH Program Administrator. Then, observations of daily supports at both homes were conducted. A review of the data suggests that implementation of inclusion and the utilization of PCP in Envision's SSH program can be observed at the systematic, the program, the direct support and the individual levels. The results from the observations and interviews indicate that the SSH residents are not typically included within the initial and weekly stabilization plan meetings. However, direct support is provided for the residents to promote inclusion within daily decision-making processes. These findings further illustrate that the implementation of inclusion interacts at these different levels, creating complex experiences for people with dual diagnosis in accessing services. Information obtained from this study can be used to improve implementation of inclusion in services provided for people with dual diagnosis who are at risk of behavioral crisis.
Interrelationship Between Teachers’ Social and Emotional Competence, Stress, and Classroom Setting

Undergraduate - Psychology

Teachers are exposed to chronic stress as they are constantly working on creating harmony between multiple demands: student demands, institution demands, and personal demands. While simultaneously addressing these demands, teachers also need to be the first responders to children with trauma, maladaptive behavior, or students with other difficulties outside of the school environment. Teacher's perceived stress profoundly affects the quality of their health, instruction, and performance—all which congruently depresses their job satisfaction. According to a large pool of research, social emotional skills lessen the risks of stress and increase protector factors for stress. In this study a group of teachers from a primary school in Chicago were invited to participate in an evaluation designed to measure their social emotional competence (SEC) and stress levels. The purpose of this study is to examine any relationship between a teacher's SEC, stress levels, and their classroom program. Essentially, this study will provide the participating school with an overall profile that will contribute to their ability to augment professional support for teachers.

The Biochemistry of Music: A Meta-Analysis and Original Composition

Undergraduate - Chemistry

The health benefits of music, both emotional and physical, have been exploited by mankind for millennia and, although many studies have looked at the relationship between these two seemingly unrelated disciplines, we have yet to determine the exact nature of their relationship. However, even without fully understanding the mechanism by which music can positively impact our well-being, it is possible to study exactly what happens in our body when we listen to music, and what musical components trigger these responses. The purpose of this meta-analysis was to gather the most recent research into the biochemistry and neurology of the body’s response to music, identifying specific musical features that cause these responses and their specific nature. Once that was determined, a series of original pieces were composed keeping these findings in mind in order to create a type of specialized music, designed to cater to specific needs. The meta-analysis found that, although some musical features elicit an almost universal response, ultimately the response to a specific piece of music will depend heavily on the individual. One study showed that some factors that contribute to an individual’s response to music include whether the person is musically inclined, any fond memories they might have connected to a type of music, whether they have a stronger inclination toward a mathematical or creative type of thinking, (Cervellin & Lippi, 2011). However, almost everyone that has been studied consistently showed the same response to two musical features: repetition and dynamicity. Repetitive music, as one might expect, resulted in very little brain stimulation but...
can be used to increase focus in certain areas. More dynamic music, or music that was unpredictable in a sensible and enjoyable way, was found to be extremely efficient at creating strong emotional responses.

202. **Perez, Jasson**  
*Undergraduate - Mathematics, Statistics, and Computer Science*  
Currently, our country is in engaged in a debate on how best to reduce crime. For communities of color these issues are of particular resonance since the issues of crime disproportionately impact communities of color. Connected to that are the sometimes competing and complementary policy approaches of gun laws, social welfare provision, policing and incarceration spending. My work will seek to answer these questions through a data-driven analysis.

203. **Perez, Stephanie**  
**Mental Health Among Paramedics in the Chicagoland Area**  
*Undergraduate - Biological Sciences*  
The purpose of this project is to describe the paramedic experience specifically in the Chicagoland area to open up a proactive discussion about mental health among EMS workers. In order to obtain a comprehensive outlook on the subject, both private ambulances, as well as municipality ambulances, are explored. The data collection portion of this project consists of ride times with both Medex Ambulance paramedics and Chicago Fire Department ambulance paramedics. In addition, Interviews with paramedics and supervisors were collected and an anonymous survey was distributed to paramedics in both ambulance services. The survey and interviews conducted focused on how individual paramedics feel their mental health is currently prioritized in their profession and if there are any working conditions that could improve that would be conducive to a healthier work experience. This project aims to explore mental health in EMS through a qualitative approach in contrast to the extensive quantitative research available on depression and suicide rates among paramedics.

204. **Perkowski, Mark; Muhammad, Durrshawar; Orozco-Nunnelly, Danielle A and Warpeha, Katherine M**  
**Role of Phenylalanine in Cell Expansion and Commitment to Cell Lineage in Young Developing Seedlings Of Arabidopsis Thaliana.**
Undergraduate - Biological Sciences

In the seed-to-seedling transition of plants, young seedlings are vulnerable to environmental damage, where the embryo must balance available resources from the seed and the surroundings to respond to environmental conditions. In the first 0-72 hours seedlings are heterotrophic, living off the reservoirs of carbon and nitrogen in the seed until they can build the photosynthetic apparatus for autotrophy and to make cell defense chemicals. In this period, resources are directed toward cell division and cell expansion. The amino acid phenylalanine (Phe) has been shown to play a crucial role in plant development, particularly in the homeostasis of reactive oxygen species (ROS), cotyledon development such as determining cell types. Phe is an amino acid but also is precursor to chemicals used in cell defense. The enzyme arogenate dehydratase 3 (ADT3) catalyzes the final step of the biosynthesis of phenylalanine, and produces the Phe required early in development. Seeds of wild type and adt3 mutated Arabidopsis thaliana plants were grown in light or darkness, with or without Phe / analogs to examine cell expansion, and cell division over time. Cell types were evaluated and quantitated at different points in development. Investigations of analogs of Phe and variation of light conditions indicate specific roles for Phe early in development. Use of Phe and analogs can have applications in optimizing plant growth for human use, and these data can be applied to better understand Phe roles in the cell cycle in animal cells.

205. Perritano, Anthony

Knowledge Places: Embedding Knowledge in the Space of the Classroom

Graduate / Professional - Computer Science

How can we help a community of science learners gain more timely and contextualized access to the knowledge that it is creating, in service to inquiry and further knowledge improvement? In a learning community approach to education, the whole classroom of students assumes “collective cognitive responsibility” for its progress, often creating a community knowledge base consisting of user-contributed content, semantic tags, votes, and other social information. While some research has investigated knowledge building environments, most designs have adopted a cloud-based interaction paradigm for contributing to and accessing emerging community knowledge. Cloud-based designs can be successful in promoting learning, however, getting young learners to attend to and leverage the community’s knowledge can be challenging. While these scaffolds do complement students’ individual interactions with the cloud-based knowledge base, they leave in place a somewhat monolithic cloud as the repository of their collective work. The goal of this research is to explore the potential for moving the knowledge base out of the cloud and into the physical space of the classroom. Supporting the construction of an emergent knowledge base in which students’ physical location within the classroom and co-location with other students serves to mediate the filtering, access to, and applications of community knowledge – through the technology paradigm of ubiquitous computing, in which physical objects, surfaces, and spaces embody digital information. This approach, “Knowledge Places” (KP), decomposes the community knowledge base into a collection of thematic (disciplinary) units which are mapped...
onto demarcated locations distributed around the classroom. This necessitates students’ physical movement among those KP sites in order to contribute or otherwise access their peers’ contributions through a “performant query.” Knowledge Places was enacted in an NSF-funded study over the course of ten weeks within a sixth-grade classroom as part of a regular life science curriculum.

206. Plocher, Sophia

A Food Service and Life Skills Training Program: Does It Increase Well-being?

Undergraduate - Psychology

Workforce development programs are a critical component of recidivism prevention for at-risk youth. A work-training program for at-risk youth was selected as a site to evaluate psychological well-being in this high-risk group. Many of the participating youth have had experiences with the criminal justice system and, in some cases, have been homeless. However, rather than focusing on the negative aspects of these youths’ lives, this study aimed to focus on the ways that at-risk youth are thriving and overcoming the numerous challenges they face in their daily lives. At-risk youth are underrepresented in the well-being research. Yet, a sense of well-being is tied to positive life outcomes, which is the purpose of workforce development. To gain an in-depth understanding of the work-training program and the youth that participate in it, multiple sources of data were collected, including informal observations collected over a period of 18 months. Additionally, ten youth, African-American and Latino, male and female, and between the ages of 18 and 27 who participated in the program completed three measures of subjective well-being over a period of several months. The measures included the Flourishing Scale, the Scale of Positive and Negative Emotions, and the General Self-Efficacy Scale. Five supplemental interviews were completed to obtain a qualitative assessment of well-being to complement the quantitative measures. Since well-being has not been assessed in this population, it was important to develop a broader sense of what well-being means to these participants, how the work-training program affected it, and the impact of participating in the study. Specifically, the participants’ experiences filling out well-being surveys will be summarized. Preliminary analyses of the data suggest that participants reported higher levels of well-being than the general population and that the surveys were used a self-monitoring tool.

207. Pocius, Stephanie; Stange, Jon P.; Jenkins, Lisanne M.; Kreutzer, Kayla A. and Langenecker, Scott A.

Decreasing Connectivity in the Cognitive Control Network Seen in Increasing Report of Non-Fatal Self-Injurious Behavior

Undergraduate - Neuroscience

Suicide annually claims the lives of over 44,000 persons in the United States, with an estimated 25 people having attempted for each completed suicide (Centers for Disease Control, 2015).
Currently, only a few studies have delved into the neurobiological differences between those who have attempted suicide and those who have not. As rates of suicide continue to grow across demographic groups in the United States (Curtin et al, 2016), advancements in the understanding of the neurobiological characteristics, as well as psychosocial risk factors, of suicide attempters are needed. In this present study, an expanded consideration of non-fatal self-injurious (NFSI) behaviors is used to predict not only risk for suicide attempt, but, through use of resting state functional magnetic resonance imaging (fMRI), determine any neurobiological differences between individuals who display greater degree of NFSI behaviors versus those with lower presentation of these behaviors. Five total subscales were constructed to measure NFSI: (1) Traditional Self-Harm (2) Traditional Impulsivity (3) Self-Detrimental Behaviors (4) Decreased Empathy and (5) Risky Behaviors. Forty-seven participants from the University of Michigan (27 female, 20 male) and 152 participants (109 female, 43 male) from the University of Illinois at Chicago were recruited and completed the Diagnostic Interview for Genetic Studies (DIGS), a neuropsychological battery, and an fMRI visit that consisted of a resting state fMRI scan. Results show that as individuals display an increasing amount of NFSI behaviors, there is decreased network connectivity in the Cognitive Control Network (CCN), a neural network involved in higher level processing. Brain regions throughout the dorsolateral prefrontal cortex and inferior parietal lobule especially displayed this relationship. These results suggest that as an individual displays more NFSI behavior, there is decreased intrinsic network connectivity. Resting state fMRI and the NFSI variable may serve as a diagnostic measure towards predicting those more at risk for suicide attempt.

208. Powrozek, Olivia

Localization of a putative coiled-coil domain contain 124 (Ccdc124) protein in Tetrahymena thermophila and its role in cytokinesis

Undergraduate - Biological Sciences

A coiled-coil protein Ccdc124 has been shown to be important for proper cell division. Mutations of Ccdc124 can grow and undergo all steps of the cell cycle except cytokinesis. The cells are unable to complete abscission and results in aneuploidy cells (Telkoparan, 2013). We have identified a homolog of Ccdc124 in the model ciliate, Tetrahymena thermophila. T. thermophila gene, TTERM_425880 (Tt_Ccdc124), shows 52% homology with human Ccdc124 at the protein level. Since this gene was uncharacterized in T. thermophila, we decided to study this gene’s function by generating a fluorescent protein fusion construct and transforming this construct into T. thermophila cells. In this study Tt_Ccdc124 was amplified from T. thermophila’s genome utilizing PCR and primers that flanked the gene. Through several cloning steps, the PCR product was fused with a natural fluorescent protein gene, Yellow Fluorescent Protein (YFP) to visualize expression. This fusion construct was successfully generated and was electroporated into T. thermophila. Two transformed lines of T. thermophila were isolated and we are going to observe expression through immunofluorescence microscopy. In studies of other organisms, expression of Ccdc124 is localized at the midbody and at the site
of abscission during cytokinesis. We anticipate localization at those structures and these findings will allow us to further understand the process of cytokinesis.

209. Prajapati, Ami; Kroc, Michelle and Anderson, Laura

**A Chan-Lam Preparation of N-Aryl Nitrones and Their Use in Cascade Reactions**

*Undergraduate - Chemistry*

Nitrones provide opportunities to access complicated organic structures through [3+2]- and [3+3]-cycloadditions, internal redox cyclizations, and cycloisomerization processes. Commonly, nitrones are synthesized through the condensation of N-hydroxylamines and aldehydes; however, these methods are limited for N-arylhydroxylamines and α,β-unsaturated ketones due to the poor nucleophilicity of the hydroxylamine, the diminished electrophilicity of the ketone, and potential competing 1,4-addition reactivity. The Anderson group has developed a fragment coupling method for the synthesis of N-arylnitrones from arylboronic acids and ketoximes that avoids these traditional road blocks. This new method has facilitated the discovery of a cascade reaction for the preparation of novel heterocycles from N-arylnitrones and electron deficient allenates. The preparation of N-arylnitrones for these cascade reactions and corresponding recent advances for the synthesis of functionalized indoles will be discussed.

210. Purohit, Rudri; Mei, Sarah; Kataria, Akshay and Tzen, Yi-Ting

**Assessing Alternating Pressure Overlay on Skin Blood Flow and Interface Pressure: a Feasibility Study on people with Spinal Cord Injury (SCI)**

*Graduate / Professional - Physical therapy*

Purpose: To test the feasibility of measuring real-time skin blood flow and interface pressure on chronic SCI patient while lying on top of an alternating pressure (AP) overlay. Methods: Single-subject design in a laboratory setting. Two subjects were examined, one with chronic SCI (age 54, male, complete SCI at T10) and one healthy control (age 25, female). Each subject underwent two study protocols with random order: lying on top of an operating room (OR) mattress with and without the AP overlay for 40 minutes. A five-minute inflation/deflation cycle was used for the AP overlay. Two laser Doppler flowmetry flat probes were placed at the sacrum and the left heel to collect skin blood flow for 50 minutes with each protocol: 10 minutes baseline blood flow during side lying, and 40 minutes of blood flow while lying on top of the OR mattress with or without the AP overlay. A whole body pressure map was used to record the interface pressure. Results: The subject with SCI demonstrated results similar to the healthy control. With the AP overlay, the interface pressure during the deflation cycles was lower than that without the AP overlay. The skin blood flow was higher during deflation as compared to
baseline with AP overlay; however without the AP overlay, the skin blood flow reduced while lying on top of the OR mattress as compared to baseline. 

Conclusion: This protocol allowed us to investigate the effect of alternating pressure overlay on skin blood flow and interface pressure in people with chronic SCI. Testing on more subjects will help us determine the benefit of implementing this AP overlay for pressure injury prevention in this high-risk population.

211. Rancel, Mariel

**Best Practices for Facilitating Laboratory Access for Blind and Visually Impaired College Students at the University of Illinois-Chicago**

*Undergraduate - Chemistry*

Introduction: The student researcher, Mariel Rancel, is a 4th year legally blind student majoring in Biological Sciences at the University of Illinois-Chicago (UIC). Her experiences struggling through General Chemistry and Organic Chemistry laboratory courses motivated her to develop a framework for faculty and staff of the Chemistry Department to better facilitate blind and visually impaired students’ participation in laboratory courses at the university. This project is a part of the Disability and Human Development 400 Capstone course. Objective: The aim of this research is to provide university faculty and staff in the UIC Chemistry Department with a comprehensive set of strategies to better facilitate the access of blind and visually impaired students to Chemistry lab courses. A two-page memo will be produced for department faculty and staff outlining some strategies and best practices. Methods: The student will conduct a review of educational literature on teaching science curriculum to blind and visually impaired students to find known best practices. The student will also reflect on her personal experiences as a legally blind student in Chemistry laboratory courses to identify barriers to class participation and success for similar students in the courses. The current laboratory equipment inventory of the General Chemistry and Organic Chemistry laboratory courses and the facilities where these courses take place will be assessed for their accessibility to blind and visually impaired students.

212. Rao, Asha and Coumbe-Lilley, E. John;

**Comparative Analysis of Disability Language across the U.S, India, and Spain**

*Undergraduate - Rehabilitation Sciences*

Words are what humans use to communicate ideas, feelings, and thoughts to others (Devlieger, 1999). Unaware, these words can have certain connotations and connected images which influence the way others think, which can then spread throughout a population. The foundation of knowledge pertaining to disability language exists. Few researchers have contributed to the source of how disability is addressed and why often negativity surrounds the concept. This study used qualitative comparative methods to compare disability language in 3 separate cultures. In each cultures a variety of mediums including: biographies, autobiographies, documentaries, and
personal narratives of professionals in rehabilitation fields, was analyzed to gain a basic background in the views of disability. The purposes of the study was to 1.) explore the use of disability language in society 2.) compare the differences of disability language used in different parts of the world to show how these populations communicate about disability 3.) Explain why disability is perceived negatively and the influence of negative perception on language use 4.) to recognize the significance of disability language. Emergent themes included: limitation, labeling, negative language use, and culture. A call to action and positive disability language use were found.

213. Rapolti, Diana Ioana and Escutia, Blanca

Water Isotopes in Peat Cores from Alaska; A study on changing climate and hydrology in the Alaskan Arctic

Undergraduate - Biological Sciences; Earth and Environmental Sciences

In this study, we try to understand how climate change over the past ~10,000 years has influenced peat accumulation in Brown’s Bog, Alaska. Peat forms from the build-up of plant material and is an important global sink of carbon. As the Arctic warms, the carbon trapped within the peat will be released into the atmosphere as carbon dioxide and methane. Both are greenhouse gases and thus will accelerate the rate of global warming. Permafrost warming, degradation, and subsidence associated with thawing can also have significant implications for ecosystems, infrastructure, and climate at local, regional, and global scales. This research advances knowledge about the co-evolution of climate and the accumulation or degradation rate of peat. We extracted water from a peat core collected and stored by the US Geological Survey and analyzed the stable isotopic ratio (δ18O, δD and D(deuterium)-excess) of pore waters at 2cm intervals throughout the core. Analysis of δD and δ18O composition of ice is used to provide understanding of regional temperature and the source of water used to firm the ice bodies in the permafrost while D-excess infers the source of subsurface ice. The data thus provided over 10,000 years of regional climate history. The data show significant variability in the regional climate over the period studied with a clear increase in the stable isotopic ratio of water towards the core’s middle. We intend to compare the climate history inferred from those stable isotopes with the peat accumulation rate to understand how peat carbon stores have responded to past warming periods. This research is also important because it provides data that allows us to investigate genetics of organisms that live in layers of peat with varying concentrations of carbon, reconstruct regional paleoclimates, and connect peat composition and water retention with the changing climate during long, past periods.

214. Razin, Aleksey and Sovansky, Erin

The Effect of Domain Interest and Experience on False Recognition via the DRM Paradigm
Common sense would suggest that interest and experience in a domain would lead to benefits in thinking, memory, and problem solving in that domain. However, interest and experience are not always advantageous. For example, Jennifer Wiley (1998) found that experience can lead to mental set in which domain knowledge prevents people from being able to solve problems. Another area where experience may be a detriment is memory for exact details. In previous studies, it has been suggested that people who are more knowledgeable in a field are more likely to remember gist information rather than specific details (Corbin, et. al, 2015). This leads us to hypothesize that if individuals with more experience on a topic are more likely to remember gist information because they have a more dense semantic network on that subject, then they may also be more likely to falsely recognize words when presented with a domain specific word list using the DRM paradigm. This study will analyze whether domain experience and interest is associated with false recognition. The purpose of this study is to determine whether experience or interest in a subject leads to false recognition of words in that topic. This study will involve 100 participants from the UIC introductory psychology subject pool. The participants will first complete a memory task using the DRM paradigm via a within-subjects design. The DRM paradigm, a model often used to study false memories, will be used to create lists in order to compare the respective groups (Roediger III & McDermott, 1995). Four lists will be administered, three of them pertaining to biology, psychology, and chemistry with one neutral control list from the original DRM study. The participants will be asked to recognize words from the provided lists, and the number of falsely recognized words from each list will be recorded. Following the memory task, participants will then complete a survey to determine their level of interest and experience in biology, chemistry, and psychology. Based on the survey, participants’ school subjects will be ranked into low, medium and high interest. A 1x4 ANOVA will be used to compare quantity of falsely recognized words for the neutral, low interest, medium interest, and high interest conditions.

215. Raziuddin, Humair; Malone, Margaret; McMahan, Caleb and Gonzalez-Meler, Miquel Angel

**Pescados blancos: Going back in time to understand the trophic consequences of a century of heavy fishing in Lake Chapala**

*Undergraduate - Biological Sciences*

Chirostoma (pescados blancos) are an important food source for people in Central Mexico and are heavily fished locally and commercially. Previously published literature shows Chirostoma species overlap in their trophic niches. This is surprising because the morphology of the species is very different. I aim to examine the evolutionary and ecological processes of five species of fishes in the genus Chirostoma in Lake Chapala, Mexico by analyzing the trophic position via stable isotopes and cranial morphology. I hypothesize that this paradox of disparate feeding morphology coupled with similar trophic position is due to changes in ecological pressures occurring in this region. Morphology may reflect the evolutionary history of the species, while trophic position reflects current ecology in these lakes. Fishing pressures from locals may have
caused the convergence of trophic position. Moreover, Chirostoma might have switched prey
types to account for ecological pressures. I used long-term data available through museum
collections to assess changes in these species from 1900 to today. I analyzed decadal changes in
cranial morphology through geometric morphometrics. This study provides valuable information
on the economically important Mexican fishes and the consequences of 100 years of
anthropogenic pressures on ecology and evolution.

216. Reichman, Brandon and Dumas, David

**Visualizing the Fourth Dimension with Virtual Reality**

*Undergraduate - Mathematics, Statistics, and Computer Science*

We created a virtual reality experience where the user can directly interact with projections of
four-dimensional objects. The application was programmed in C# and created with the game
development software Unity along with the Oculus virtual reality headset and Touch controllers.
The application has the capability of reading arbitrary four-dimensional OBJ files and rendering
them in a virtual environment. Using the Touch controllers, the user has the ability to apply
three-dimensional and four-dimensional rotations on these objects. This program can be used to
aid one’s understanding of space, objects, and rotations in four dimensions. This work was
completed in a Fall 2017 semester project in the Mathematical Computing Laboratory at UIC
(unc.math.uic.edu). The project was funded by a grant from the UIC College of Liberal Arts and
Sciences Undergraduate Research Initiative (LASURI).

217. Reiter, Rolf; Majumdar, Shreyan; Luciano, Cristian; Cai, Kejia; Kajdacsy-Balla, Andre; Mar,
Winnie; Caldwell, Brandon; Abern, Michael and Klatt, Dieter

**Improved Prostate Cancer Detection Using ex vivo 9.4 Tesla Magnetic Resonance Elastography (MRE)**

*Graduate / Professional - Bioengineering*

Purpose: To assess the detection and localization of prostate cancer (PCa) using ex vivo 9.4 Tesla magnetic resonance elastography (MRE). This is the first study for the assessment of 6 human prostate specimens without pathology fixation or prior radiation therapy. Despite the success of multiparametric magnetic resonance imaging (mpMRI) for the assessment of PCa, it suffers from significant limitations, such as a low specificity to differentiate benign prostatic hyperplasia (BPH) from malignant tumors and moderate inter-reader reliability [1,2]. Methods: Immediately after radical prostatectomy, six human prostate specimens underwent MRE at 500 Hz using a pre-clinical 9.4 Tesla MRI (Agilent, 310/ASR, Santa Clara, USA). The prostate was divided into 12 segments for both MRE and whole-mount pathology. The results were correlated to determine the sensitivity and specificity of MRE parameters. Results: According to pathology, 33 of the total 72 segments and an average of 5.5 of the 12 segments for each prostate were positive for PCa. For MRE, a segment was defined as cancerous when the stiffness values of 10
% of its pixels were higher than the mean stiffness (G') + standard deviation (SD). G' ± SD for all segments, healthy segments, and cancerous segments were found to be 6.15 kPa, 4.20 kPa, and 6.44 kPa, respectively. Sensitivity and specificity were 86 % and 52 %, respectively.

Conclusion: This study shows promising preliminary results for the assessment of PCa of ex vivo human specimens without fixation or prior radiation therapy. In comparison to a current mpMRI study, ex vivo MRE was slightly less sensitive (93 % vs. 86 %) but more specific (41 % vs. 52 %) for PCa detection [2]. The examination of more prostate specimens is planned. Our preliminary results suggest that an additional MRE sequence has the potential to add valuable quantitative information to current scan protocols. Acknowledgments: This study was funded in part by the German research foundation (Deutsche Forschungsgemeinschaft, DFG).

References:

218. Restrepo, Catalina and Engel, Kathryn

**Disablist Hate Crime**

*Undergraduate - Applied Psychology*

According to the Hate Crime Statistics Act of 1990, the Attorney General is obligated to collect reports of hate crimes across the United States (Grattet and Jenness, 2001). Hate crimes motivated by racial and religious biases are commonly known. However, people with disabilities are also individuals who become targets to hate crimes. The governmental data collected on disablist hate crimes often do not coincide with the data collected by researchers. Hate crimes are often underreported by people with disabilities based on societal and environmental barriers. It is important to address the issue of underreporting, as well as those who have difficulty reporting for themselves, and identifying best practices to increase hate crime reports. Ultimately, this will be useful for activist groups, organizations, and law enforcement agencies to address the issues of hate crime and better protect targeted individuals. In order to address underreporting and best practices, I conducted an extensive literature review on these topics to identity causes for underreporting and recommendations to improve reporting by people with disabilities. Interview questions were written based on the best published practices in the literature. I utilized the Delphi method to interview several individuals who are experts in disablist hate crimes and best practices in the United States, United Kingdom, and Australia. In addition, I asked those experts to nominate other experts in the field. Data was collected, and the qualitative coding of themes identified the most common best practice and barriers from the initial interview. Once the common themes were identified, the experts were contacted a second time to rate the importance of best practices identified by the group.

Keywords: disability, hate crime, intersectionality, underreporting, best practices

Citation:

219. Reyes, Karina; Garcia, Martha; Reyes, Katherine; Serrano, Gabriela; Diaz, Alicia; Buitrago, Diana; Yanez, Betina; Perez-Tamayo, Alejandra; Iacobelli, Francisco; Buscemi, Joanna and Penedo, Frank J.

**Development and Feasibility of the My Guide Intervention for Hispanic Breast Cancer Survivors**

*Undergraduate - Medical Social Sciences*

Research has shown that Hispanic women have reported high cancer-related symptom burden and low health related quality of life in comparison to non-Hispanic whites and use smartphones to acquire health information at similar or higher rates than other ethnic groups in the US. The purpose of this study is to improve the quality of life of Hispanic women who have recently completed active breast cancer treatment through the use of an interactive eHealth intervention called Mi Guia. Achieving optimization for the Mi Guia Smartphone-based intervention is carried out into two phases: Aim 1 is a mixed method approach for collecting qualitative data (n=20) on the study content, conducting usability testing on the Mi Guia smartphone application, and conducting feasibility testing to refine the application's content. Aim 2 focuses on optimizing components for Mi Guia using mixed method approaches by evaluating its efficacy relative to a smartphone application on health promotion (Mi Salud), the control condition, throughout an 8-week randomized trial. Participants are early-stage women who have completed active treatment (n=80) and will complete the same procedures regardless of the randomization assignments to help minimize potential confounding factors. Preliminary results from Aim 1A and Aim 1B allowed the identification of prominent themes within respondent interviews: ‘side effects of cancer treatment, psychological well-being, and breast cancer knowledge’ (78%), ‘fear of recurrence’ (89%), and ‘patient-provider communication and social support’ (100%). Further exploration of themes within Aim 1C aided the development of Mi Guia. Participants’ Mi Guia smartphone application usage was reported (M=8.54, SD=4.44), and exit interview/satisfaction survey reports revealed high scores (M=4.59, SD=0.76), reflecting potential satisfaction with application. Data collection and analysis is ongoing within Aim 2. Our findings indicate that Hispanic breast cancer survivors are interested in learning how to improve their overall health and wellbeing post active breast cancer treatment.

220. Reyes, Mariana; Fogel Jessica; Kilic Ece and Maki Pauline

**The Association Between Depression and Cognition among Women with Breast Cancer**

*Undergraduate - Psychiatry*
AIM: Breast cancer is one of the most prevalent types of cancer and affects women at a disproportionately higher rate than men. Additionally, women are twice as likely as men to suffer from depression. Previous research has shown associations between depression and cognition stating that depressed midlife women underperformed in tasks measuring verbal memory, verbal working memory, semantic fluency, and processing speed. However, there is still limited research on how women with breast cancer are particularly affected by the interactions between depression and cognition. METHODS: The purpose of the present study was to investigate the association between depression and cognition in a sample of thirty midlife women (mean age = 52) with breast cancer. Participants completed the Center for Epidemiological Studies Depression Scale (CES-D) to assess depressive symptoms and the California Verbal Learning Test (CVLT) to assess memory, concentration, and language abilities. RESULTS: A Pearson product-moment correlation coefficient was computed to assess the relationship between CES-D scores and CVLT total learning, short delay free recall, and long delay free recall. The results showed no correlation between the two variables, $r = 0.12, n = 30, p = 0.42$. Overall, increases in CES-D scores do not affect CVLT total learning scores. CONCLUSION: Although no significant correlation between depression and cognition was found, additional studies should further explore how these two variables interact in the context of breast cancer. Future studies should use larger and more diverse samples in order to get a more general and clear image on these interactions. Assessing the associations between breast cancer, depression, and cognition can help in gaining a more comprehensive understanding on how to provide more adequate social and medical support for these women.

221. Richardson, Kaitlynn; Burke, Kelly and Jones, Tayler

The Effects of Race on Attitudes About Animal Abuse

Undergraduate - Psychology

Animal abuse has come to be recognized by law enforcement as a possible indication of domestic violence, often times leading investigators to family abuse. Due to states making more laws pertaining to animal abuse, more and more cases of animal abuse have been able to be brought to the attention of the authorities and taken to court. However, there have been no rigorous studies of jurors’ perceptions of animal abuse, so when a case reaches the legal system, attorneys are left to their own intuitive devices in preparing cases for court. In this study, I examined jurors’ perceptions of animal abuse, and what factors influence their decisions about perpetrators. Specifically, as a part of a larger study, I examined how an individual’s racial identification affects how he or she perceives/views animal abuse. I hypothesized that individuals who identify as being Black or African American would have lower levels of sympathy and empathy for animals being abused than their White American counterparts. I also hypothesized that individuals who identify as being Black or African American would have lower levels of sympathy and empathy for abused dogs than cats. For the first hypothesis, we found that individuals who identify as being Black or African American did have lower levels of sympathy and empathy for animals being abused than their White American counterparts. For
the second hypothesis, we did not find that individuals who identify as being Black or African American have lower levels of sympathy and empathy for abused dogs than cats. In fact, we found that Black or African Americans have more sympathy and empathy for abused dogs than cats.

222. Ritchason, Daniel and Nares, Salvador

The Impact of Digital Media on the Modern Dental Practice: Generational Differences in Seeking Oral Health Care

Undergraduate - Biological Sciences

The field of dentistry has roots that date back well into the Middle Ages. As time has progressed, increased knowledge and technological developments have fundamentally changed the profession resulting in greater precision and effectiveness of dental procedures. Moreover, the internet and availability of social media sites, such as Facebook and Twitter, have changed the availability and type of oral health care information available to patients. Significantly, these media outlets may influence patient perception of dentistry as dental providers utilize these digital sources as tools to market dental services and products to the public. Accompanying technical advancements has been a visible shift in demographics of individuals seeking dental care. Some of the largest and most prevalent differences are noted between Generation X and Baby Boomers, which include people born between 1965 to 1980 and 1946 to 1964 respectively, and Generation Y, also known as the Millenial's, who are people that were born between 1981 and 1997. The differences in how individuals utilize technology and digital media, and its potential impact on oral health care has likely caused generational gaps in perception of dental care. In turn, this difference in perception can affect the interaction between dentist and patient as well as the choice of provider and dental treatment rendered. Due to this, it is hypothesized that digital media will have a greater impact on the perception of people belonging to Generation Y than that of people belonging to Generation X or the Baby Boomers.

223. Robledo, Casandra; Molina, Yamile and Peña, Kryztal

Empowering older Latinas to Engage in Community Volunteerism

Undergraduate - Community Health Sciences

Purpose: Health volunteerism may help to buffer the impacts of structural forces on marginalized communities through greater community mobilization, resources, and health-protective norms. We evaluated the effectiveness of an empowerment/navigation program on volunteerism behavior of older Latinas. Methods: A community-based sample of 52-74 year old Latinas who had no past experience in health volunteerism engaged in either a 3-week health education program or a 3-week group empowerment program on the community benefits of volunteerism with the option of participating in a volunteerism navigation program. Data were collected from baseline and post-intervention surveys as well as study records. Results: Most of
our 70 participants: were born in Mexico (85%); had a household income of $10,000 (72%); and, had less than a high school education (79%). Relative to education participants, empowerment participants reported greater community involvement (M = 20.62, SD = 2.59 versus M = 19.19, SD = 2.68) and spoke to a greater proportion of individuals in their network about volunteerism after the 3-week intervention (M = 48%, SD = 46% vs. M = 25%, SD = 40%; p = 0.04). They were also slightly more likely to be interested in the likelihood of future political engagement (77% vs 55%; p = 0.07), although relatively comparable in terms of future volunteerism (74% vs. 79%; p = 0.62). Although 91% of empowerment participants enrolled in our navigation program, we were only successfully contacted and obtained agreement to volunteer 13% of the time. Reasons to not volunteer included competing priorities (e.g., grandchildren, work) and a lack of interest. Discussion: Preliminary findings suggest that Latinas may be more motivated to participate after learning about health volunteerism in group settings. Simultaneously, to claim the promise of these group workshops, navigation programs need to identify better communication strategies for successful contact and address competing priorities and lack of interest.

224. Rodriguez, Mayra

The Impact of China’s Plastic Ban on US Recycling Industries

Undergraduate - Office of Sustainability

For the past 20 years, recycled waste produced by countries was one of China’s largest imports. China has become one of the few countries that willingly accepted and capitalize on the market of recyclable waste, such as plastic and paper produced in other countries like the United States. Growing concerns over the impact of this policy on their environment has led China to reevaluate the future of the recycling industry and has implemented a plastic ban that states they no longer want to accept other countries’ waste. The plastic ban was implemented on January 1st of 2018, and the US is now facing a bigger crisis with what to do with all the recyclable waste. This research consists of measuring the impact of this ban on the recycling industries in the United States, and specifically analyzing the streams of recyclable waste produced by the University of Illinois in Chicago.

225. Roebuck, Cynthia

Dragonfly Abundance and Species Richness in Chicago Community Gardens

Undergraduate - Psychology

Dragonflies provide an ecological service by feeding on biting insects, and community gardens provide a niche for resting and eating beyond the waters where they mate. The predictable variables are size of garden, distance from water, grass, dirt, percent of green and woody space, flowering plants, volume and plant diversity, and the response variables are abundance and species richness. The data was collected at 23 community gardens in the Chicago area with 5
visits to each garden completed from July-September 2017. Each observation consisted of 2 random spot observations and 1 center observation. Each of these point observations lasted for 8 minutes totaling 24 minutes total for each observation.

226. Rojas, Juan and Molina, Yamile

Paid Sick Leave Policies in Chicago: Do racial/ethnic disparities persist post-implementation?

Undergraduate - Community Health Sciences

Racial/ethnic minorities’ limited access to paid sick leave (PSL) represents an important determinant of health disparities. Consequently, Chicago recently passed an ordinance to enable greater PSL access. While studies have examined consequences of PSL-based policies, few have examined how they may alleviate racial/ethnic disparities. We address this gap by: 1) characterizing racial/ethnic differences in PSL access and use among City of Chicago employees pre- and post-implementation; and 2) conducting semi-structured interviews post-policy implementation with potentially affected individuals. We made FOIA requests to the City’s Human Resources and Finances departments for January 2003-November 2017 for department-level data on demographics, number of workers without PSL access and number of leave hours used. We also conducted semi-structured interviews with City of Chicago part-time employees to ask about their awareness, perception, and recommendations on the PSL policy. Pre-ordinance findings from 36 departments representing an average of 1,011 workers (37% Black, 17% Latinx, 5% Other) suggest departments with more Black workers and departments with more Latinx workers had more workers without PSL access (B= 0.637, p= 0.024; and B= 0.441, 95%CI [0.006, 0.876], p= 0.047, respectively). Post-ordinance findings from the same departments suggest departments with more Black workers had more workers without PSL access (B= 0.153, 95%CI [0.045, 0.262], p= 0.007) and lower number of leave hours used (B= -0.001, 95%CI [-0.002, 0.000], p= 0.004). Findings from interviews suggest a low level of awareness of the policy, and perceptions that the policy could have helped workers in the past and will help them in the future. Respondents also provided recommendations for disseminating policy information. Quantitative findings suggest the new PSL policy has not alleviated racial/ethnic disparities for Black workers with the City, while respondents’ insights suggest this may be attributed to low levels of outreach and awareness.

227. Russel, Sarah; Gangemi, Antonio; Patel, Krupa; Khalaf, Hazbar; Masrur, Mario and Hassan, Chandra

Conversion to Laparoscopic Sleeve Gastrectomy After Complications or Failure of Laparoscopic Gastric Band: A Systematic Review of the Literature and Cost Considerations

Graduate / Professional - Surgery
No universal consensus has been achieved as to whether the laparoscopic adjustable gastric band to laparoscopic sleeve gastrectomy conversion should be performed in one or two steps. To determine the differences in operative outcomes and cost, a systematic, comprehensive review of the literature was conducted using the PubMed database from the National Institutes of Health. Nine studies were included with 809 patients. Weighted averages were calculated to compare operative outcomes, and cost analyses were conducted with these averages. Results indicate a longer operative time for the one-step approach than the two-step approach, but studies included in the meta-analysis found no statistical difference between the two. The two-step approach was found to have a longer length of hospital stay, but this finding refuted included studies that indicate no significant difference. Complication rates were higher for the one-step approach than the two-step approach, and costs associated with complications average $806 more for one-step patients than two-step patients. This suggests that the two-step approach could prove better for patient safety and cost outcomes, but both approaches are comparable in operating time and length of stay.

228. Sabir, Maryam

**Analysis of daf-7 Expression in C. elegans Mutant for HLH-3 Background**

*Undergraduate - Biological Sciences*

The Alfonso laboratory has evidence that in the absence of hlh-3 function, sex-specific neurons in both hermaphrodite and male C. elegans fail to reach their terminal differentiation state. This affects egg-laying behavior in hermaphrodites and mating behavior in males. The lab also knows that amphid wing “A” cell neurons (AWA) do not appropriately differentiate in HLH-3 mutants. Though AWA neurons are not sex-specific, they have a male-specific function for detecting hermaphrodite pheromones. Thus, it appears that neurons with sex-specific roles are functionally defective in HLH-3 mutants. This project studies the amphid sensory “J” neurons (ASJ) to determine whether they are also affected by hlh-3 deletion. These are found in both sexes and express daf-7, a gene that encodes for the ligand DAF-7 known to have a role in mating behavior. Males also express daf-7 in amphid sensory “I” neurons (ASI), making daf-7 expression patterns in males notably different than that in hermaphrodites. This project assays the differentiation state of ASJ neurons with the reporter pdaf-7::gfp in the context of HLH-3 mutants for comparison to expression in wild type animals. Daf-7 expression was found to be altered only in mutant males. Most mutant males expressed daf-7 in two or three neurons, as opposed to four. In those that expressed daf-7 in four neurons, some patterns were dim with neurons appearing altered in size or shape. Mutant hermaphrodites did not show altered expression. As ASJ neurons are shared between the sexes but used for sex-specific behavior only in males, these results suggest further that the deletion of hlh-3 affects neurons with sex-specific roles, regardless of whether the neurons are shared between the sexes or unique.
Is experience with children related to fearing being falsely accused of child abuse?

Undergraduate - Psychology

In court, jurors' preexisting attitudes can skew how they will respond to sensitive cases, such as those related to child sexual abuse (CSA). One factor that could lead to potential bias is a person's own fear of being falsely accused of CSA. Current explanations of this fear do not account for a person's experience with children. It is possible that one's level of experience with children might influence the extent to which one fears false accusation. In my research, I tested this possibility for the first time. I hypothesized that the more experience people have with children, the less they would fear being falsely accused. The first step in my research was to assist in developing a social psychological scale measure of "fear of false accusation" (FOFA) of CSA. 964 undergraduates responded to a 20-item questionnaire intended to assess FOFA. Scale reliability analyses led to scaling the 20 items down to create a revised 19-item FOFA scale (full scale Cronbach's = .83; revised scale Cronbach's = .84). Correlational analyses indicated that, as predicted, participants with more experience with children had less fear of false accusation (FOFA rpb= -.13, p < .01). Even so, the correlations were small, indicating that people's experiences with children were only one small factor influencing their level of fear about being falsely accused. Nonetheless, these findings may provide contextual information necessary for understanding jurors' attitudes, beliefs, and biases in CSA cases. For example, future research can assess whether the more one fears being personally falsely accused of child abuse, the more skeptical one might be as a juror in CSA cases that go to trial.

Disparities in Rural American Sentencing

Undergraduate - Honors College

This capstone’s purpose was to investigate whether there are differences between rural and urban criminal court proceedings in America. This study began by questioning why criminal theories appear to be based on urban crime rates, this is since, there is not much to be said of crimes that occur in rural settings, and how these crimes contribute to our knowledge of the criminal justice system in the U.S. The study’s research questions were: How do court proceedings differ between rural and urban settings? What factors play a role in rural sentencing v. urban court proceedings? How do these factors impact how the sentencing occurs in rural v. urban settings? A comparative case study of six different jurisdictions was conducted. The urban cases were: USA V. Hamilton, USA V. Pawnell, and USA V. Rehberg, while the rural cases were: USA V. Henderson, USA V. Graham, and USA V. Percival. Court proceeding documents were obtained using Public Access to Court Electronic Records (PACER). In my analysis, I conducted a context analysis of the documents obtained, including cross-referencing documents in each cases’ docket to look for patterns of similarities and differences between rural cases and their urban counterparts. Finally, I analyzed the most substantial document in each case, the
Sentencing Memorandum. Some key finding are: 1) there are more documents for a given rural case than urban cases, 2) rural cases change their pleas from not guilty to guilty later than urban cases, and 3) that indictment, when someone is charged with a serious crime, is filed later in rural cases. This could imply that rural cases tend to be more complex than their urban counterparts. However, some key follow up research will need to be done where court transcripts would be available to assess how they are in fact, more complex.

231. Saleh, Yaseen; Valencia-Olvera, Ana; Panchapakesan, Kailash; Balu, Deebika; York, Jason and LaDu, Mary Jo;

**FPLC analysis of apoE-lipoproteins in EFAD mouse plasma: The effects of genotype and age**

*Undergraduate - Anatomy and Cell Biology*

Alzheimer’s disease (AD) is an irreversible neurodegenerative disease with no cure and only palliative therapeutics. Rare autosomal dominant mutations increase the peptide amyloid-b (Ab42), which can aggregate to form both amyloid plaques and small soluble aggregates or oligomeric Ab (oAb), the latter considered a proximal neurotoxin. APOE4 is the greatest genetic risk factor for AD, increasing risk up to 15-fold compared to the common APOE3, while the rare APOE2 is neuroprotective. APOE encodes for Apolipoprotein E (apoE), a major component of very low density lipoproteins (VLDL) and high density lipoproteins (HDL) in the periphery, as well as the only apolipoprotein expressed within the central nervous system (CNS), working to transport cholesterol (Chol.) to cells. Soluble oAb can associate with these lipoproteins, facilitating its clearance, thus reducing neurotoxicity. In this study, we used the unique EFAD mouse model, which express human APOE genes and 5 familial AD (FAD) mutations, to quantitate the oAb associated with the lipoproteins containing the different apoE isoforms with respect to age. EFAD plasma samples from males at 6 and 18 months were separated by Fast Protein Liquid Chromatography (FPLC), providing detailed elution profiles for apoE, cholesterol, and oAb. We found that VLDL total protein is higher in E2FAD, an artifact exacerbated by age due to ineffective clearance of VLDL remnants in mice with Type III hyperlipoproteinemia. ApoE levels in lipoproteins follow apoE3 > apoE4 and are reduced with age. Cholesterol in HDL classes follows: E3FAD >> E4FAD and declines dramatically with age, while cholesterol in VLDL classes increases with age. oAb elution in lipoprotein fractions follows: E3FAD > E4FAD, an association that decreases with age. These results show that with age, lipoprotein remodeling in EFAD mouse plasma is disrupted, resulting in the loss of lipoprotein classes, and thus, a reduced association of oAb with lipoproteins.

232. Sanchez, Kevin

**Acoustic Patterning with Projection Based Stereolithography**

*Undergraduate - Mechanical and Industrial Engineering*
By combining various materials that serve mechanical, electrical, chemical, and thermal functions with controlled local distributions, smart devices and machines with multiple functionalities can be fabricated. This project studies a new particle patterning approach during additive manufacturing to fabricate multi-functional smart composite objects. An acoustic field is integrated into the projection based stereolithography system to pattern different micro-particles into dense parallel curves or networks in the liquid resin. Effects of acoustic field settings and manufacturing process parameters on patterning are modeled and experimentally characterized. Various particle patterning results are presented. An acoustic field assisted projection stereolithography testbed has been developed. A thermal management application of in situ manipulations of particle dispersion patterns within a 3D printed polymeric composite architecture was demonstrated. The feasibility of the proposed approach for multi-functional

233. Saneie, Navid; Kulkarni, Varun and Anand, Sushant

Exploring drop transition to Leidenfrost state on nano/micro-structured surfaces

Graduate / Professional - Mechanical and Industrial Engineering

A drop gently placed on a highly superheated surface can last for long time, running amok in different directions as it remains separated from the solid surface by an invisible vapor cushion formed due its own rapid evaporation. This regime referred to as Leidenfrost state is of great practical importance to numerous industrial applications such as power plants, electronics cooling and boilers. For these applications, it is desirable to delay the occurrence of this regime to as high temperatures as possible. Thus efforts in last decade have been directed to understand the role of surface wettability and roughness as increase in these parameters is generally found to increase the Leidenfrost point to an extent. Although a general trend for LFP on microstructured surfaces has previously been reported, a thorough investigation of a cross-over from transition boiling regimes to Leidenfrost state on such surfaces has not been investigated in detail. Herein, the authors discuss the role of nano/micro and hierarchical structures in controlling the Leidenfrost behavior of drops across wide temperature ranges. Precisely controlled features were obtained on silicon surfaces using photolithography techniques. While controlling a constant heat flux transferred to the silicon substrate, Leidenfrost temperatures were measured and observed by a high-speed camera to recognize the transient boiling and rebound behavior. Theoretical and experimental analyses were conducted to map the transition regimes with respect to the surface topology. Dynamic effects due to droplet size and impact velocity were considered to elaborate on the nature and mechanism of transition boiling and Leidenfrost state with respect to the microstructure properties.

234. Satyadev, Falak

Is the Balance Sheet Approach at odds with the Income Statement Approach?

Undergraduate - Accounting
Ilia Dichev, in her 2008 paper, states that the Balance Sheet orientation of accounting is flawed and undermines the essential features or figures that determine a company's financial health and growth. Dichev explains that the importance placed on assets is overstated. Assets do not present economic value of a company; managers and investors should consider income as a primary tool. However, my project explains that the Balance Sheet and Income statement are not at odds with one another. Balance Sheet numbers derive the numbers of the Income Statement. Now, these two financial statements are important for financial analysis, but for the financial analysis of publicly traded companies or similar-sized companies. Small business owners do not place importance on the financial statements. They only care about the cash and their tax-return. Thus, it is important to know that the balance sheet and income statement are important indicators of a company's well-being, but it depends on the size of that company.

235. Savchuk, Sol; Christofalos, Andriana L. and Raney, Gary E.

**Bilingual Advantage: Does it Exist?**

*Undergraduate - Psychology*

Do bilinguals have an advantage? In the present study, we evaluated the popular claim that bilinguals have superior executive function compared to monolinguals. Executive function is an umbrella term that describes abilities to coordinate higher order information processing, such as attention, perception, alertness. It is an exceedingly valuable adaptation and is known to be highly plastic and experience dependent. Therefore, it is to our best interest to isolate the factors that promote superior executive functions. Bilingualism is argued to be one of such factors. We controlled for other variables that have also been shown to produce an executive function advantage, such as video game experience and musicianship. To evaluate executive function, we used a modified Flanker task, which measures the ability to inhibit responses to irrelevant stimuli and effectively respond to the target stimuli. We predicted the early bilingual group (participants who acquired their second language before the age of 5) would perform best on the Flanker task, followed by late bilingual groups (participants who acquired a second language after the age of 5), with monolinguals performing worst. Surprisingly, the late bilingual group demonstrated the worst performance (an executive function disadvantage) compared to early bilinguals and monolinguals, whereas the latter two groups showed no difference in performance. We did not find evidence for the commonly proposed bilingual advantage, although we did find evidence suggesting late bilingual disadvantage with regards to executive functions. We speculate that, if bilingual advantage exists, it does not preset itself within the first 15 years of second language acquisition. Moreover, within the first 10 years of learning a second language, bilingualism leads to inferior executive function.

236. Schultz, Jeremy; Whiteman, Philip and Jiang, Nan

**A Scanning Tunneling Microscopy and Tip-Enhanced Raman Spectroscopy Study of a Surface-Catalyzed Intramolecular Dehydrocyclization Reaction**
The assembly of organic molecules on a surface is a growing method to develop useful electronic and catalytic characteristics in organic thin films. Simultaneously, catalyzed dehydrocyclization reactions are critical steps in the oil refining process, as crude simple molecules are used to produce high-octane aromatic hydrocarbons. Molecular self-assembly and intramolecular reactions can be competing processes, but through a fundamental mechanistic understanding there is the potential for the optimization of the chosen path and the rational design of a material or catalyst. In this study, the self-assembly and surface-catalyzed dehydrocyclization reaction of a naturally occurring model molecule was investigated at the most fundamental level, that of the single molecule, on various coinage metal single crystals. The tandem technique of Scanning Tunneling Microscopy (STM), a technique capable of imaging single molecules and atoms, and tip-enhanced Raman spectroscopy (TERS), a unique method that reveals the energy of the vibrations of an individual molecule, was applied to this chemical system. The catalytic parameters for the intramolecular dehydrocyclization reaction were found to critically depend on the identity of the metal single crystal. Simultaneously, the spatial sensitivity of STM revealed alternate reaction products in small quantities that would otherwise be impossible to observe. The sample was heated to induce the dehydrocyclization and TERS spectra were acquired before and after the reaction. A difference between reactant and product molecules is unambiguously verified. Furthermore, the STM images and TERS spectra reveal a large difference in molecule-surface interaction between reactant and product molecules. Fundamental characterization of this system with the tandem technique of STM-TERS reveals chemical information necessary for the rational design of organic thin films and optimization of a surface-catalyzed dehydrocyclization reaction.

237. Schwarzman, Logan; MacGillis, Kyle; Schwarzman, Logan and Chmell, Samuel

Radial Nerve Palsy Following Uncomplicated Total Hip Arthroplasty

Introduction: Nerve injury is a known complication of total hip arthroplasty, but it is most commonly seen in the lower extremities. There is however minimal discussion about the incidence of upper extremity nerve palsies, specific to the radial nerve, during total hip arthroplasty for a patient in the lateral decubitus position. The radial nerve can be injured while in the lateral decubitus position due to poor positioning of the posterior part of the humerus onto the hard-surgical table, causing compression of the nerve. In total hip arthroplasty, this is significant due to the lateral decubitus position being the primary position for the patient in posterior and lateral approaches. We report a case of radial nerve palsy following uncomplicated total hip arthroplasty in the lateral decubitus position. Case Presentation: 49-year-old male presenting with symptoms of radial nerve palsy on post-operative day number one from a contralateral total hip arthroplasty. The patient has a body mass index of 22.15 and was undergoing a right total hip arthroplasty with a posterior approach. He was placed in the lateral decubitus position with an axillary role in place for approximately two hours and forty-five
minutes. Occupational therapy, orthopedics, and EMG were used to evaluate the patient in the postoperative time for his radial nerve palsy. Conclusion: Our case report demonstrates a rare nerve palsy complication that can be associated with positioning in total hip arthroplasty surgeries. Knowledge of this complication can be used to avoid pressure points in future THA surgeries in the lateral decubitus position.

238. Shafiuddin, Hamed

The Role of Sphingosine-1-Phosphate on Lung Injury

Undergraduate - Pharmacology

Sphingosine-1-phosphate (S1P) is a bioactive lipid mediator involved in both intracellular and extracellular processes including inflammation, survival, migration and proliferation. S1P acts through a G-Protein coupled receptor and through intercellular interactions. S1P has been shown to mediate different forms of lung injury such as lipopolysaccharide (LPS)-induced lung edema, radiation induced lung injury (RIDI), acute lung injury (ALI), fibrotic lung disease, reactive oxygen species (ROS)-induced lung damage, and ischemia-reperfusion injury (IRI). These forms of lung injury have serious clinical importance. By studying S1P related signaling pathways and the regulation of S1P, we are coming closer to coming up with therapies for these conditions. Early studies have included analysis of LPS-induced acute lung injury in a canine model. This study showed that intravenous S1P had resulted in a reduced inflammatory lung injury. Recent studies have analyzed different means of S1P regulation such as targeting S1P metabolizing enzymes via in vitro and in vivo studies. In recent studies, S1P production has been shown to have both positive and negative impacts on lung injury. In certain forms of lung injury, such as hyperoxia induced ROS lung injury, it has been beneficial to downregulate S1P production. However, in other cases such as in ALI, it has been beneficial to upregulate S1P. Upregulation occurs through the inhibition of S1P Lyases and the activation of S1P kinases while downregulation occurs through the opposite interaction. Many studies have been done on these enzymes. Further studies in the future will allow for discovery of possible therapeutics in lung injury.

239. Shahab, Aarish

Entranced by the Sun

Undergraduate - Neuroscience

The basis of this project lies in exploring humanity’s fascination with the Sun. Since the Ancient Egyptians’ time, Sun has permeated different religious, cultural, and mythical ideologies, offering insight into the values and beliefs of different civilizations that embodied it. Though many of these specific beliefs have died down, the symbolic nature of the Sun has endured, immortalized by humanity’s physical depiction of it. First in drawings and sketches, and later in photographs, the Sun evidently continues to play a symbolic role in daily life. While including an
analysis of different photographic techniques used to capture the Sun, this project also includes a personal compilation of photographs collected by the presenter incorporating different Sunrises and Sunsets, in an effort to compare and contrast the ancient symbolic representations of the Sun with his own – all to answer why humanity continues to be entranced by the Sun.

240. Sharifi Asl, Soroosh; Soto, Fernando A.; Foroozan, Tara; Abbasi, Pedram; Yuan, Yifei; Amine, Khalil; Lu, Jun; Salehi-khojin, Amin; Balbuena, Perla B and Shahbazian-Yassar, Reza.

Surface Nano-Coating as a Novel Approach to Improve the Structural Stability of Layered Oxide Cathodes in Li-ion Batteries

*Graduate / Professional - Mechanical and Industrial Engineering*

A major challenge of lithium ion batteries is the safety concerns that arise from non-equilibrium service conditions, such as, temperature rise, or high cut-off voltage. Under these circumstances the cathode decomposes and releases oxygen which then reacts exothermically with the organic electrolyte and triggers the thermal runaway event[1]. Here, we report that, graphene-encapsulation of LiCoO2 particles, can effectively suppress oxygen release from the cathode under abusive conditions. Utilizing mono-layer graphene oxide nano-sheets, the encapsulation of individual LiCoO2 particles, with a cost effective and scalable method, was achieved. In this research, advanced spectroscopy and microscopy methods were employed to investigate the suppression of oxygen release from the graphene-encapsulated LiCoO2 particles. High voltage electrochemical cycling and differential electrochemical mass spectroscopy (DEMS) have shown that, capacity retention of the cathode, subjected to high voltage cycling, is improved which is due to significant reduction in the oxygen evolution at high voltages. Thermal analysis and in-situ TEM/EELS results have shown that, graphene-encapsulation does not allow for liberation of oxygen at elevated temperatures. Specifically, the valence reduction of transition species is significantly delayed in the samples with graphene protection layer. Our results illustrate that detrimental phase transitions that occur at the surface of LiCoO2 at elevated temperature, is completely suppressed under graphene-encapsulation, while areas in the same particle without graphene protection layer are totally damaged and degraded. Additionally, ab-initio molecular dynamic (AIMD) results suggest that, due to the charge accumulation at the graphene/LiCoO2 interface, the under-coordinated oxygens that dissociate from the LiCoO2 structure, form C-O bonds with the graphene layer and do not evolve as O2 atoms. We believe that this research is a remarkable step towards the design of thermally-stable oxide cathodes and ultimately can lead to safe, high voltage Li-ion batteries.

241. Shaw, Daniel and Ugalde, Claudio

Calculation of Nuclear Statistical Equilibrium in Neutron Star Mergers

*Undergraduate - Physics*
Neutron star-neutron star (NS-NS) mergers are theorized to be the main source of rapid neutron capture elements (r-process) in the universe. We will investigate the abundances present after a NS-NS merger, specifically those heavier than iron. Although an exact equation-of-state is unknown for neutron stars, it is theorized that their initial composition is due to Nuclear Statistical Equilibrium (NSE). This occurs when the processes of synthesis and destruction of heavier elements within the star occur with an equal frequency. As the two stars gravitationally spiral into each other, they lose a portion of their mass, which forms a ring around them. The composition of this ring is the matter, which was in NSE before ejection. After the merger occurs, the ring is irradiated with neutrons, creating heavier elements via the r-process. This study will use the code Skynet to calculate the expected initial composition of the ring. NSE data will then be used as an input for an r-process calculation to compare with observations post-merger, allowing us to gain insight concerning neutron stars and the creation of the heavier elements of the periodic table.

242. Sheth, Alisa

Environmental Influences on Older Adults with Intellectual Disability and Dementia: An Exploratory Ethnographic Study

Introduction: Despite the increasing number of adults aging with intellectual disabilities (ID) and dementia, there is limited research that examines this group’s perceptions and experiences around aging with multiple disabilities, specifically considering participation across various environments and within current systems. While there is a growing body of literature focused on surveillance data and caregiver accounts, older adults with ID and dementia have traditionally been left out of the knowledge generation process about their lives. To address this gap in the literature, I have undertaken a multi-phase qualitative research study to improve understandings of the impact of the environment on participation of people aging with ID and dementia and their caregivers, explore relevant accessible and inclusive methodologies, and contribute to related theories and models. Methods: I recruited adults diagnosed with ID and dementia to participate in small focus groups utilizing nominal group technique to identify important environmental barriers and supports. I also conducted focus groups with caregivers utilizing traditional methods. I analyzed transcripts using a grounded theory approach in addition to researcher notes and participant feedback related to the appropriateness of this methodology for this group and future research implications. Results: Initial analysis suggests that important barriers and supports for participants with ID and dementia occur within both micro and macro environments, primarily related to social interactions and access to meaningful activities. Caregivers focused more on physical accessibilities and disease symptoms than participants with ID. Conclusion: People living with ID and dementia can actively participate in research related to their perspectives and experiences given the utilization of methodologies that support a variety of cognitive accommodations. Their participation is important given the difference perspectives
offered when compared to those of caregivers. Results from this initial phase will be utilized to focus more in-depth exploration of environmental barriers and supports.

243. Shumov, Alina and Shippy, Scott

Analysis by Capillary Electrophoresis of Amino Acid Composition in the Cornea of Diabetic Mice

Undergraduate - Chemistry

Corneal health can many times be indicative of various health issues; for example, diabetic patients very often also suffer from corneal health issues. Specifically, the chemical composition of the tear film, such as the amino acid or protein composition, may change in the presence of an illness. Since such problems may progress into blindness, early detection and treatment is key. The purpose of this research is to create a non-invasive procedure to measure the relative metabolism of specific amino acids and proteins in tears. Arginine, glutamine, and glutamate are of particular interest, as changes in the metabolism of these compounds are often precursors to corneal health deterioration. Tears are collected directly onto a phenol red thread, derivatized, and run through capillary electrophoresis in order to determine the relative amount or presence of each compound in a sample. Standards of each amino acid have been run and recorded in order to create a comparative baseline, and human tears have been tested successfully with this method. The tears of diabetic (db/db-) mice will be run and compared to the tears of control mice with the goal of creating an early diagnostic model to predict and prevent corneal deterioration in diabetic human patients.

244. Siddiqui, Mariam; Burgos, Mae Ysabelle; Collins, James; Deb, Nandini and Herrera, Yadira

Assessing Single Payer Knowledge Among Undergraduate Students In an Urban University

Undergraduate - N/A

Background: This research project addresses the complications that result from the myriad of health insurance plans in the United States as well as Physicians for a National Health Program’s support of a transition to single-payer health care in the U.S. Purpose: The project aims to produce three types of results: (1) Increase in knowledge of and familiarity with single payer health care among college students; (2) Identify the aspects of single payer health care most beneficial to college students; (3) Generate population interest data for PNHP. Methods: We used a convenience sample of approximately 60 undergraduate students from various classes at a university in an urban setting. The first phase of the project involved designing an infographic. To test the effectiveness of the material, a preliminary survey was created, with questions referencing the content in the infographic. The survey also asked questions gauging the population’s baseline knowledge of single payer healthcare. During the second phase of the project, a preliminary survey and infographic were disseminated to the participants. After
completing the initial survey, participants were given a physical copy of the infographic. In the third phase, a post survey was administered 1-2 days after exposure to the infographic. Upon feedback, the initial infographic was updated to better address the population’s concerns and interests. Outcome: After being exposed to the infographic, students were more knowledgeable about the characteristics of single payer, and therefore more comfortable explaining single payer to a peer. The aspect that appealed to students the most was access for everyone and lifetime coverage. Furthermore, the infographic was altered based on the new population information for PNHP.

245. Singh, Sanjana

Mechanism of epithelial mesenchymal transition (EMT) in erlotinib resistance in NSCLC cells containing both wild type and mutant EGFR

Graduate / Professional - Biomedical and Health Information Sciences

EMT is a process occurring in development of metastasis where epithelial cells lose their polarized structure, due to downregulation of adherens junction proteins such as E-cadherin, Claudin and ZO-1. Cells exhibiting EMT show upregulation of mesenchymal markers Vimentin, N-cadherin and transcription repression of E-cadherin. EMT may mediate Tyrosine kinase inhibitor (TKI) resistance to EGFR in patients with activated EGFR mutations. This TKI resistance could be due to a secondary EGFR T790M mutation in the kinase domain which may induce EMT. An EMT regulator, p120-catenin when not bound to membranous E-cadherin forms a complex with Kaiso factor suppressing its transcription repressor activity, promoting oncogenesis. PRMT1, another EMT inducer is also overexpressed in NSCLC cells undergoing EMT which acquire cancer stem-cell (CSC) like characteristics by expressing a CSC marker ABCB1. The purpose of this study is to investigate EMT and CSC like characteristics in wild type-EGFR TKI resistant H358, H2170 cells and TKI resistant EGFR mutant H1975 cells (L858R and T790M mutation) and TKI sensitive EGFR mutant H3255 cells (L858R mutation). We will also evaluate the expression of EMT biomarker, total β-catenin with progression-free survival (PFS). Thus, we hypothesize that EGFR TKI resistant cells undergo EMT due to modulation of the Wnt/β-catenin, p120-catenin/Kaiso factor pathways, and PRMT1. Further modulation/knockdown of these EMT mediators may help overcome TKI resistance. Our results indicate upregulation of PRMT1 and p120-catenin by 4.0 and 3.2-fold in H1975 cells, 2.6 and 7.0-fold in WT-EGFR(H358ER) cells. EMT transcription factors such as Slug, Snail and Twist were also upregulated by 3.18, 6.2 and 1.68-folds and E-cadherin, Claudin and ZO-1 were downregulated by 8.6, 11.6 and 15.2-folds in H1975 cells compared to H3255 cells. Also, N-cadherin, ZEB1 and Vimentin were upregulated by 4.9, 3.0 and 10.7-fold. Inhibition of PRMT1 and p120-catenin increased erlotinib efficacy by 27% and 40% in H1975 cells. Total β-catenin expression in 84 patients diagnosed with NSCLC, show a median survival of 15 months in high expression group compared to 31 months in low expression group.
246. **Siragusa, Cecilia; Haut, Kristen; Telagi, Parnika; Galindo, Briana; Pridgen, Sarah; Saxena, Abhishek and Hooker, Christine**

**Social Cognition Tasks May Not Predict Symptoms in Schizophrenia**

*Undergraduate - Psychiatry*

Schizophrenia is diagnosed via the presence of positive and/or negative symptoms; but individuals with schizophrenia also show impairments on a wide variety of cognitive and social cognitive measures. Previous research suggests that cognitive measures may be a greater predictor of real-world functioning, however the relationship between specific symptoms and social cognitive measures is unclear. This study evaluates the relationship between social cognitive task performance and the severity of related symptoms. 58 individuals with schizophrenia completed a battery of social cognitive measures including the empathic accuracy task, a measure of how well individuals can infer the emotions of others, and the ambiguous intentions hostility questionnaire (AIHQ), a measure of the tendency of individuals to assume hostile intentions in the actions of others. Subjects also completed a clinical interview and were rated on the Positive and Negative Symptom Scale, which assesses the severity of a number of symptoms of schizophrenia. Correlation analyses were used to examine the relationship between performance on the social cognitive tasks and the symptom ratings, as well as the relationship of both measures to overall social and role functioning. Prior research suggests that Blaming Others as measured by the AIHQ may be related to symptoms of suspiciousness/paranoia, however we found no significant relationship between these measures ($r= .214$, $p>.1$). There were also no significant correlations between empathic accuracy and symptom ratings of interpersonal relationships. These results suggest that there is not a strong relationship between symptom ratings made following a clinical interview and performance on a task of empathic accuracy or a measure of attributional bias. While some previous research has suggested a modest relationship between bias and suspiciousness/hostility in schizophrenia, this study did not replicate those results. This suggests that individuals' performance on measures of social cognition may be largely independent of their current symptom severity.

247. **Sivaramakrishnan, Anjali and Madhavan, Sangeetha**

**Neural and functional effects of recumbent stepping in Amyotrophic Lateral Sclerosis (ALS) – a pilot study**

*Graduate / Professional - Physical Therapy*

Background: Aerobic exercise is known to promote neuroplastic responses in the healthy and injured brain. Although the role of exercise in ALS is still debated, there is some evidence to suggest that moderate intensity exercise programs can improve function and may reduce disease progression. Here, we sought to investigate the safety and feasibility of recumbent stepping as an intervention to possibly facilitate neuroplasticity and slow disease progression in individuals with ALS. Objective: To determine the effects of a 4-week moderate intensity, recumbent stepping program on lower limb motor cortex excitability, disease progression and motor
function in individuals with ALS. Participants: 7 ambulatory participants with a diagnosis of clinically probable, or definite ALS (mean ALSFRS-R = 33.16 ± 7.13) were recruited for this study. Intervention: Participants performed moderate intensity exercise (40 – 60% Heart Rate Max) for twelve sessions (3 times a week/4 weeks), with the NuStep ergometer (total time – 40 minutes, 5 minutes warm up and cool down each). Outcome Measure(s): Neurophysiological outcomes included recruitment curves of TMS-induced (Transcranial Magnetic Stimulation) motor evoked potentials of the tibialis anterior muscles. Clinical outcomes included ALS Functional Rating Scale Revised (ALSFRS-R), 10 meter walk test (10MWT), 6 minute walk distance (6MWD), Timed up and Go test (TUG), Fatigue Severity Scale (FSS), Beck Depression Inventory (BDI) and quality of life as measured by SF-12. Measurements were collected at baseline and 4-weeks post intervention. Results: 6 participants completed the trial without any adverse issues. One participant dropped out due to an ankle fracture unrelated to exercise. Motor evoked potentials were present only in 2 participants, and showed a trend towards increased excitability (13 – 17%) from baseline. There was a 7 % improvement in gait speed that was statistically significant (P = 0.046). Changes in 6MWD and TUG showed a trend towards improvement (12- 16 % change; P > 0.05). ALSFRS-R, SF 12, BDI and FSS did not show any change with exercise. Conclusion: Results from this preliminary study supports that recumbent stepping is a safe and feasible exercise intervention in individuals with ALS, resulting in significant improvements in gait speed.

248. Sodimu, Debra

The Effects of Immersion on Verbal Fluency on Second Language Learners

Undergraduate - Psychology

Study abroad programs have continuously been promoted as an experience that benefits second language (L2) development, impacting learners’ fluency and accuracy. However, it is not well established whether an immersive experience such as study abroad may also have effects on their first language (L1). The current longitudinal study is inspired by a non-longitudinal study by Linck, Kroll and Sunderman (2009) who observed two groups of students (students learning in Spain or at their home university) performing category verbal tasks. This is a measure of verbal fluency, defined as a person’s ability to form and express words while being limited under a specific criterion, usually time and/or category (Wysokiński, Zboralski, Orzechowska, Gałecki, Florkowski & Talarowska, 2010) and is essential for daily communication and interaction. This study focused on how immersion affects the verbal fluency of L2 learners, with participants being exchange students at Austral University in CABA, Buenos Aires, Argentina. They completed a verbal fluency task, listing as many words possible given three letters (P, S, A) and three categories (animals, clothing, food). This was done in English and Spanish, followed by a short Spanish proficiency quiz. The entire process was completed twice in the term, once at the beginning or middle, and once at the end of the term. A preliminary analysis of the resulting data demonstrated a small increase in Spanish proficiency and a larger increase in Spanish verbal fluency. The decrease in English verbal fluency seen with the participants from the study done
by Linck et. al (2009) was not present. The results will be considered in light of the study’s limitations. However, if the results were held up by future research, they suggest that study abroad programs may be beneficial for the development of second language proficiency and fluency while not affecting first language verbal fluency.

249. Solís Barroso, Cecilia; Stefanich, Sara and López, Luis

The Role of Language Dominance in Code-Switching Research

Undergraduate - Hispanic and Italian Studies

This research project analyzes the role of language dominance in a Spanish/English intra-sentential code-switching production task. Here, we examine language dominance and its effect on the production of code-switched nonce verbs that are comprised of English roots and Spanish affixes (e.g. \[zert\] ENG eando SPN) in order to determine if these words are produced with solely Spanish sounds, English sounds or a combination of both (see Stefanich & Cabrelli-Amaro, in press for rationale). In order to determine which sound system is employed, we focus on the sound /z/, present in the English but not Spanish sound system, and its counterpart /s/, present in the English and Spanish sound systems. To measure language dominance, participants complete the Bilingual Language Profile (Gertken, Amengual, & Birdsong, 2014), a widely used scalar measure that provides a dominance score from -218 to 218, by analyzing several factors that influence language dominance, such as language history, language use, and language attitude. On this continuous scale, a score of 0 to -218 is classified as English dominant and 0 to 218 is classified as Spanish dominant. The dominance scores and results of the production task are then submitted to correlation analysis in order to determine if there is an effect between the two. The results of the analysis indicate that that there is no significant correlation between language dominance and the production of /s/ and /z/, as representative of Spanish and English sound systems, in code-switched words. The results provide evidence that for these bilinguals, language dominance is not a factor in the production of code-switched words. The bilinguals all produce these code-switched words with Spanish sounds regardless of their language dominance.

250. Solovieva, Uliana

Neuroticism and Facial Emotion Perception in Women

Undergraduate - Psychiatry

Facial emotion recognition is a crucial aspect of nonverbal communication that is involved in our everyday social interactions. Facial perception is highly dependent on contextual information. One possible domain that influences facial perception is within-perceiver features, such as personality traits. It has been shown that high neuroticism healthy individuals are less accurate in recognition of emotional facial expressions (Sawada, 2016). Previous literature has also indicated that neuroticism is negatively correlated with happy facial expression recognition which is related to the altered processing of positive emotional information (Andric, 2014).
A study investigated the relationship between neuroticism and accuracy in identification of emotional (sad, angry, fearful, happy, neutral) facial expressions in the Facial Emotion Perception Test (FEPT) in a sample of 65 females with no current or psychiatric history. Contrary to our hypotheses, we did not find a significant correlation between neuroticism and accurate identification of emotional faces (sad, happy, angry, fearful, or neutral) and thus were unable to come to the same conclusions as did the previous findings. The current study suggests that neuroticism is not related to the accurate perception of emotional faces in women.

251. Sotelo, Daniel; Helgren, Travis R.; Xu, Lianyan L.; Mehta, Yash R.; Korkmaz, Melissa A.; Pavlinov, Ivan and Aldrich, Leslie N.

Microwave-Assisted, Asymmetric Synthesis of 3-Amino-2,3-Dihydrobenzofuran Flavonoid Derivatives from Chalcones

Undergraduate - Chemistry

Flavonoids are naturally occurring polyphenols in fruits, vegetables, and tea that possess numerous proposed health benefits. Their effects can range from anti-inflammatory to anticancer due to their ability to influence cell-signaling cascades. Because of their unique properties and reported health benefits, their chemical properties are of great interest. These polyphenols can contain various skeletons, including chalcones and benzofurans. A route to synthesize aminoflavanols, specifically 3-amino-2,3-dihydrobenzofurans, has been achieved. The process takes advantage of microwave-assisted synthesis, which enables rapid generation of flavonoids and analogues. The route begins with a microwave-assisted, acid-catalyzed aldol condensation to create chalcones. The next reaction was a stereoselective Corey-Bakshi-Shibata (CBS) reduction to provide alcohols. Next, a Sharpless asymmetric epoxidation was performed with the alcohol intermediates to access isomeric epoxyalcohols. Lastly, a one-pot microwave-assisted, acid-catalyzed epoxide opening with various amines followed by an intramolecular nucleophilic aromatic substitution provided the desired benzofurans. Furthermore, a library of benzofuran derivatives was also created. The biological activity of these molecules, as well as the activity of the chalcone intermediates, was examined in human lung and cervical cancer cell lines.

252. Srinivasan, Sanjana; Priyamvada, Shubha; Anbazhagan, NA; Kumar, Anoop; Alrefai, Waddah and Dudeja, Pradeep

Lithocholic Acid Inhibits the Expression of Cl-/HCO3- exchanger DRA (Down Regulated in Adenoma) in Intestinal Epithelial Cells

Undergraduate - Liberal Arts and Sciences

The majority of bile acids are actively reabsorbed in the distal ileum, and only ~5% reach the colon in normal conditions. Bile acid malabsorption (BAM) associated with disorders such as inflammatory bowel disease (IBD) increases the delivery of bile acids to the colon leading to diarrhea. DRA plays an important role in chloride absorption in the intestine. Mutations in the
DRA gene lead to congenital chloride diarrhea. Also, reduced DRA expression is implicated in IBD associated diarrhea. However, the role of DRA in bile acid diarrhea is not fully understood. Since bile acids are known to modulate gene expression, the hypothesis was that bile acids decrease DRA expression in intestinal epithelial cells. As both primary (chenodeoxycholic acid, CDCA) and secondary (deoxycholic acid, DCA, and lithocholic acid, LCA) bile acids are increased in the intestinal lumen in BAM, the effects of these bile acids on DRA expression in Caco-2 cells was examined. LCA treatment (10-50 µM, 24h) significantly and dose-dependently decreased DRA mRNA (~70%) and protein expression (~50%) showing maximum inhibition at 30 µM LCA. There was no significant alteration in DRA mRNA expression in response to CDCA and DCA. A time-course of LCA treatment (30 µM) demonstrated a significant decrease in DRA promoter activity as early as 8 h that was sustained for 16 and 24 h. These data indicate that LCA (but not other bile acids) decreased DRA expression at the transcriptional level. These effects may underlie the pathophysiology of diarrhea associated with bile acid malabsorption.

253. Stoltz, Barak Valenzeno, Matthew; Scotti Alves Tonin Simoni, Matheus; Gray, Daniel and Stoltz Barak

**AIAA Liquid Rocket Design: Injector and Nozzle Systems**

*Undergraduate - Mechanical and Industrial Engineering*

A liquid propellant rocket is the most efficient form of delivering payloads into outer earth orbit. AIAA’s mission for this senior design is to begin the development of a liquid propellant rocket for competition use with a high goal of breaking 145,000 ft. Various propellants, injector designs, plumbing, and nozzle geometries are explored. Extensive research and analysis is conducted and documented in each category with a final decision backed by in depth decision matrices.

254. Storme, Kayla; Bosse, Nathan; Wagner, Cole; Yarbrough, Douglas and Mohr, Justin

**Exploring Kharasch-type gamma-Functionalization of Enone Substrates**

*Undergraduate - Chemistry*

Functionalization of gamma-carbons in enone substrates is a synthetically valuable, yet relatively unexplored reaction. Carbon–halogen bonds exhibit unique reactivity and are useful for further transformations due to their strong bond polarities. Herein we report our discovery of an iron-catalyzed polyhaloalkylation and polyhaloalkenylation at the gamma-carbon of enone substrates with great potential for complex molecules synthesis.
Effect of a Virtual Reality-based Dance Training Paradigm on Movement Kinematics and Community Ambulation Among Individuals with Chronic Stroke

Graduate / Professional - Rehabilitation Sciences - Physical therapy

Purpose: This study thus evaluated the full-body kinematics of a custom-designed virtual reality (VR) - based dance protocol. Methods: Individuals with chronic stroke (n=15) received a VR-based dance training for 6 weeks using Kinect dance gaming “Just Dance 2014” for one hour thirty minutes. To quantify changes in full-body kinematics and compute the center of mass (CoM) participants (n=15) were exposed to dance movements to VR-based dance movements. An 8-camera motion capture system recording at 120 Hz was used to record full-body kinematics and compute CoM. Postural stability was examined via CoM position excursions in the anterior-posterior (AP) and medio-lateral (ML) directions for the dance movement. Hip, Knee and ankle joint angle excursions were also measured on the paretic side. Gait speed and cadence were recorded using an electronic walkway. Functional measures were used to assess balance control (BERG), fear of falling (Fall efficacy scale [FES]). Changes in physical activity during community ambulation (1 week before and after intervention start) were assessed using Omran HJ-321 Tri-Axis Pedometer. Results: The AP, ML CoM excursion, along with hip, knee, and ankle angle excursions significantly increased (pre-vs post, p<0.05). Post-intervention there was also a significant increase in the number of CoM peaks in the ML direction. Furthermore, post-intervention there was a significant increase in the number of knee and ankle joint angle peaks (p<0.05). Gait outcomes of speed and cadence, functional measures (BERG and FES) community ambulation increased significantly (pre vs. post, p < 0.05). A correlation analysis indicated that participants post-training ML CoM excursion correlated with BERG [R2 of 0.415 (p<0.05)], and FES [R2 of 0.8213 (p<0.05)]. Conclusions: Results validate the effect of this protocol for training CoM stability in AP and ML direction and lower extremity joint angles on the paretic side. Such improvements resulted in increased community ambulation in stroke.

Examining Intra-rater and Inter-rater Reliability of the CLASS Measure

Undergraduate - Sociology

The validity and reliability of the Classroom Assessment Scoring System (CLASS), a system of evaluating classroom quality that focuses on teacher-student interactions, has been examined in several studies, many of which were affiliated with the researchers who developed the measure. Yet, few independent studies have been conducted, including of various facets of its reliability. The study of intra-rater reliability presents a particular challenge for researchers, since master ratings from master CLASS coders are often not readily available to obtain accurate intra-rater reliability data. The goal of the analysis presented in this paper is to independently acquire a better understanding of how rater reliability changes over time after raters are certified by studying multiple aspects of rater reliability (including inter- and intra-rater reliability, and
agreement with a certified CLASS trainer’s codes) of the Early Investments research group at the
University of Illinois at Chicago. The statistical analysis of the research group’s data, including
over four hundred video segments from a dozen coders and calculations of percent agreement
and kappa statistics, suggests that its inter-rater reliability was likely unrelated to the amount of
time that passed from the initial certification, and that the group’s intra-rater reliability would
likely have stayed at or near the levels needed for certification, if the group had been re-tested for
reliability using standard CLASS procedures. Furthermore, the results of the analysis found that
certain dimensions, such as Language Modeling and Productivity, showed a lower degree of
inter-rater reliability than other dimensions. The data that was collected from the group may have
been limited by factors such as the possibility of rater drift during consensus coding and previous
exposure to the master coded videos. Despite these limitations, the data has many strengths, such
as the high number of raters and the controlled conditions under which it was obtained.

257. Tabang, Dylan Nicholas; Yergey, Alfred L.; Harrington, Peter B.; Porter, Forbes, D. and
Cologna, Stephanie M.

Mass Spectral Profiling to Identify Cerebrospinal Fluid Markers in Niemann-Pick Disease,
type C1

Undergraduate - Chemistry

Niemann-Pick disease, type C1 (NPC1) is a fatal disease resulting from defects in lysosomal
lipid storage that leads to progressive neurodegeneration. In the central nervous system, these
cellular effects manifest as cerebellar ataxia and tremors. The use of patient cerebrospinal fluid
(CSF) for biomarker discovery in this disease provides insight as a representative of the central
nervous system. The present work focuses on the discovery and identification of a biomarker of
NPC1. The use of a fuzzy multivariate rule-building expert system (FuRES) and formation of
consensus mass spectra from matrix-assisted laser desorption/ionization (MALDI) mass spectra
has shown several differences between control CSF and NPC1 patient CSF. In particular, we
seek to identify a biomarker species with a singly charged ion peak at 3511.8 m/z. Aliquots of
control CSF were concentrated and purified before analysis. The intact peptides were analyzed
on an Agilent Q-TOF mass spectrometer. The quadruply, pentuply, and sextuply charged ions of
the species were detected and selected for MS/MS with variable collision energies. After this
validation of the biomarker species via electrospray ionization (ESI), several enzymatic digests,
including trypsin, pepsin, and endoproteinase LysC, were performed to improve database
searching for the biomarker species. Spectral data were subsequently analyzed via PEAKS
Studio, due to a lack of matches in searched databases, in order to perform de novo sequencing
of this likely novel peptide. Present work is focused on modelling tentative sequences produced
by PEAKS to confidently identify the biomarker species. Work is also focused on validating
results from the MALDI experiments with an ESI method using CSF samples from NPC1 and
control patients.
Understanding the Role of ftsH Gene in Salmonella Enterica

Graduate / Professional - Pharmacy

The purpose of my research project was to create a deletion of the ftsH gene in Salmonella enterica. FtsH is a membrane-bound ATP-dependent protease in bacteria that is critical for degrading membrane proteins. This mechanism remains unknown as there are no apparent consensus amino acids on the target proteins that ftsH appears to recognize. Therefore, conducting this study will contribute to our understanding of the mechanism of the ftsH protein degradation pathway. In the past, ftsH has been studied extensively in Escherichia coli (E. coli). It has been found that the essential gene ftsH can be deleted if a suppression mutation in the fabZ gene occurs. Due to the high homology of Salmonella to E. coli, we first attempted to treat Salmonella like E. coli to delete ftsH in the same manner - by creating a mutation in fabZ first. Therefore, the initial step was to create a point mutation in fabZ gene before cloning it into the plasmid puc19, send the construct for sequencing to verify the point mutation, and then clone it into a plasmid (pKOV) that can replace the chromosomal wild type fabZ with the point-mutated fabZ. Once these steps were accomplished, the goal was to then make the ftsH deletion mutant. The transformation of pKOV itself into salmonella, however, proved to hinder progress to the generation of a mutant ftsH gene, as the transformation of pKOV itself was not successful. However, this study could serve as a component of even greater studies regarding Salmonella strain related disease states and eventually, assist in drug development to combat such disease states. This research opportunity intrigued me as it hones in on the microbial aspect of potential pharmaceutical research and drug discovery.

Design, Synthesis, and Biological Evaluation of Tetrahydroisoquinoline-Based Histone Deacetylase 8 Selective Inhibitors

Graduate / Professional - Medicinal Chemistry and Pharmacognosy

Histone deacetylase 8 (HDAC8) is a promising drug target for multiple therapeutic applications. Here, we describe the modeling, design, synthesis, and biological evaluation of a novel series of C1-substituted tetrahydroisoquinoline (TIQ)-based HDAC8 inhibitors. Minimization of entropic loss upon ligand binding and use of the unique HDAC8 “open” conformation of the binding site yielded a successful strategy for improvement of both HDAC8 potency and selectivity. The TIQ-based 3g and 3n exhibited the highest 82 and 55 nM HDAC8 potency and 330- and 135-fold selectivity over HDAC1, respectively. Selectivity over other class I isoforms was comparable or better, whereas inhibition of HDAC6, a class II HDAC isoform, was below 50% at 10 μM. The cytotoxicity of 3g and 3n was evaluated in neuroblastoma cell lines, and 3n displayed concentration-dependent cytotoxicity similar to or better than that of PCI-34051. The selectivity
of 3g and 3n was confirmed in SH-SY5Y cells as both did not increase the acetylation of histone H3 and α-tubulin. Discovery of the novel TIQ chemotype paves the way for the development of HDAC8 selective inhibitors for therapeutic applications.

260. Tangen, Katherine; Ponce, Johanna; Frazier, Karissa and Hamilton, L.J.

**Increasing Referrals of African American Women to the Chicago Department of Public Health Breast Health Services Program Through a Social Media Campaign**

*Undergraduate - Public Health*

Background: African American women have higher breast cancer mortality rates compared to their white counterparts. This can be attributed to the lack of access to quality mammography services and follow-up care. In 2017, the Chicago Department of Public Health in conjunction with the Metropolitan Breast Cancer Task Force created the Breast Health Services Program, which aims to decrease the disparity in breast cancer mortality. To achieve an increase in the number of referrals to the program, we created a culturally conscious Facebook advertisement. Prior research indicates that Facebook is the most utilized form of social media by the target population and can be more cost-effective than traditional recruitment strategies. Aims: The aim of this project was to increase the number of African American women receiving mammograms and follow-up care by creating a culturally conscious Facebook advertisement. This advertisement emphasizes the importance of mammography services and provides viewers with a direct link to the Breast Health Services Program website. Methods: An advertisement depicting African American patients and doctors with the slogan, “Screen Today, Live Tomorrow. When Breast Cancer is Found Early, You Have a 99% Chance of Survival” was created. The team consulted with breast cancer survivors on this advertisement and received positive feedback. The team utilized Facebook’s Boost feature, which uses self-reported demographic data to determine who sees the ad on their Facebook page. Results: The ad campaign was run for five days. A total of $20 was spent on the campaign, with an individual cost per engagement of $0.17. Upon completion of the pilot, 491 people viewed the advertisement and 116 either clicked, liked, or shared it. Conclusion: The utilization of social media for recruitment may reach wider audiences, cost less than traditional methods, and can potentially reduce the disparity in breast cancer mortality.

261. Tate, Alexander; McKenna, Mairead and Cervone, Daniel

**Cognitive Fluency Ratios and Depressive Correlates**

*Undergraduate - Psychology*

Schematicism refers to the relevance of a concept, attribute, or attitude towards something to an individual’s sense of self and understanding of their social position in the world around them. Cognitive fluency refers to ease of mental access to a subset of information, which is presumably greater in schematic domains than in non-schematic domains. In order to determine the relative
ratios of cognitive fluency in schematic versus non-schematic domains and in positive versus negative domains, cognitive fluency was operationalized as the relative magnitudes of time-restricted responses to four prompts. These prompts fell into four quadrants: positive schematic, negative schematic, positive non-schematic, and negative non-schematic. It was hypothesized that the general population, as represented by 50 subjects recruited using Amazon Mechanical Turk (Mturk), would exhibit greater fluency in schematic and positive domains than in non-schematic and negative domains respectively. Additionally, a modified version of the Quick Inventory of Depressive Symptomatology (mQIDS) was administered in order to search for depressive correlates to skewed fluency ratios. In particular, it was anticipated that depressive symptomatology would correlate with a skew towards negative schematic fluency.

262. Telagi, Parnika; Haut, Kristen M.; Guty, Erin; Dodell-Feder, David; Saxena, Abhishek; Pridgen, Sarah; Galindo, Briana and Hooker, Christine I.

Examination of Empathic Accuracy Across Phases of Psychosis

Undergraduate - Psychology

Introduction: Empathy, the ability to understand and share the subjective emotional states of others, is crucial for social functioning. Current research suggests that empathy is impaired in individuals with schizophrenia and that they show impairments in social functioning and interpersonal relationships. The direct impact of impaired empathic ability on their social functioning is unclear, as is whether this impairment occurs prior to the onset of the disorder. This study aims to compare the empathic accuracy of individuals at clinical high risk for psychosis (CHR) and individuals with schizophrenia to controls. Methods: This study included 45 healthy individuals, 37 CHR individuals, and 44 individuals with a diagnosis of a schizophrenia-spectrum disorder. Subjects completed an empathic accuracy task where they were asked to make inferences about the naturalistically occurring emotions of individuals as they recalled autobiographical events. Subjects continuously rated what they thought the emotions of the individuals recalling the events were and were then scored for accuracy using the person’s self-reported feelings. An ANOVA was conducted to assess for group differences in empathic accuracy performance. Results: ANOVA shows a significant group difference ($F=19.323$, $p<.001$) in overall empathic accuracy performance. Using the Tukey HSD, this significant effect was shown to be driven by differences between the schizophrenia and the CHR groups and between the schizophrenia and control groups. The average correlation for the schizophrenia group was .493 whereas the CHR and control groups showed correlations of .698 and .689 respectively (higher correlation indicating greater concordance between subject and target). There was no significant difference between the control and the CHR groups. Conclusions: Individuals with schizophrenia had significant impairment on empathic accuracy. CHR individuals did not show any impairment compared to a healthy control sample, which suggests that impairments on empathic accuracy may become apparent after the onset of the disorder.
263. **Tellez, Oscar; Ali, Amna; Danek, Amory and Wiley, Jennifer**

**Do Magic Tricks Rely on Incorrect Initial Representations?**

*Undergraduate - Psychology*

Seeing things in a new light can be illuminating. A new perspective can help induce a sudden insight into the solution to a problem that was not possible from an incorrect initial representation. The present study used the relatively new domain of magic tricks as a problem-solving task. Magic tricks have been argued to require representational change. The main aim of this study was to test whether magic tricks cause people to start from an incorrect initial representation of situation. This experiment used verbal protocols to test the assumption that magic tricks lead to incorrect initial representations, similar to classic insight puzzles, but in contrast to routine problem solving. Undergraduate students from UIC attempted to figure out the solutions to a set of Math problems, Insight puzzles, and Magic Tricks while thinking aloud. The Math and Insight problems were presented on a paper booklet and the Magic Tricks performed by a professional magician were presented via video. Two independent raters coded the protocols for evidence that the problems elicited incorrect initial representations. The overall rate of incorrect initial representations for the Magic Tricks was more similar to the rate for incorrect initial representations of classic Insight problems than the rate for Math problems. The results show that Magic Tricks rely on representational change to switch from an initial incorrect representation to a correct one which is important because this requires Insight.

264. **Tiu, Christel**

**Harmony**

*Graduate / Professional - Industrial Design*

The intent is to design an object that fills the gaps in the current lifestyles of independent seniors who socialize but occasionally feel isolated and lonely in their home. The object attempts to create a reassuring presence of companionship in their homes by converting separated, individual activities into communal experiences through real-time music-sharing.

265. **Toledo, Yasmine**

**Cross-Contextual Interpretation of the CLASS Measure**

*Undergraduate - Communications*

This study introduces examines cross-cultural interpretations of the Classroom Assessment Scoring System (CLASS). The measure was based primarily on U.S. research, and was initially developed and validated as part of a study of white, middle class U.S. children. In recent years, the CLASS has become widely used. Such use includes a diverse array of local settings within the U.S., such as monitoring efforts for publicly-funded early care and education (e.g., Head
Start, state pre-k; Child Trends, 2017; Gordon, 2016). Such use also includes international contexts, including European and Central and South American countries. How researchers may interpret and consider adapting the CLASS for these local contexts is currently not well understood. which was developed as a tool to rate the quality of preschool classrooms and their teacher(s) in the United States. The CLASS was created by Robert C. Pianta, Karen M. LaParo, and Bridget K. Hamre in collaboration with TeachStone and is being utilized in 23 states. This study determines whether CLASS constructs are received perceived differently by raters from different backgrounds due to subjective wording. The study provides an analysis of the CLASS manual's wording in the emotional support domain which embodies four subcategories or dimensions: positive climate, negative climate, teacher sensitivity, and regard for student perspectives. Words like distant, appropriate, considerable, observable, ample, and infrequent were analyzed. Interviews with researchers who have used the measure in a Spanish-speaking country are also underway. The implications of cross-cultural validity in the emotional support domain are discussed in relation to members of individualistic versus collectivist societies.

266. Tovar, Kayleigh and Federle, Michael J

Elucidating Rgg-mediated quorum sensing networks in Streptococcus pneumoniae and testing their contributions in pathogenesis

Graduate / Professional - Microbiology and Immunology

Quorum Sensing (QS), or bacterial communication by intercellular chemical signaling, is a process common to many (if not most) bacterial species; yet, it is unclear how QS signaling pathways contribute to virulence in many clinically significant pathogens. The Federle lab has helped to characterize a family of transcriptional regulators, known as Rgg proteins, as mediators of QS. We and others have shown the importance of Rgg proteins in multiple species of streptococci in regulating expression of genes that may enhance their ability to colonize and infect the host. Rgg proteins are known to regulate genes important for 1) controlling virulence; 2) promoting the development of resistance to lysozyme, a host-produced antimicrobial enzyme; 3) stimulating the formation of biofilms, or protective bacterial communities; and 4) initiating the development of natural competence to take up DNA from the environment. The role of the Rgg proteins in the pathogenic lifestyle of the clinically significant pathogen S. pneumoniae has yet to be investigated, but published genome-level mutagenesis studies indicate Rgg proteins in this organism are critical in vivo animal models of infection. We have constructed isogenic mutants for each Rgg protein important in vivo and have performed transcriptomic analysis to identify gene targets under Rgg-regulation. Our analysis has revealed 18 gene targets under regulation by the Rgg protein sp_0141 in the pneumococcal encapsulated strain TIGR4 (serotype 4). Interestingly, this Rgg appears to be regulating a gene set important for transporting metal ions. We are in the process of testing gene targets of interest in order to understand Rgg-mediated QS and its role in virulence. Understanding the molecular networks under QS regulation is the first step towards developing novel approaches for interfering with bacterial communication and combatting clinically significant pathogens.
267. Trandai, Kristen

**Effects of Body-Worn Cameras on Officer Satisfaction and Burnout**

*Undergraduate - Criminology, Law, and Justice*

In recent years, there has been an increase in reports of police brutality and racism. The body-worn camera (BWC) is seen as a solution to this, giving an unbiased report of officer-civilian interactions. However, the acceptance of new technology in the workplace, along with the amount of strain associated with it, has been greatly linked to performance. Despite its rapid adoption, many concerns have been raised for BWCs, particularly due to its large financial and time-consuming burden. In addition, previous research shows that only about half of organizations using camera surveillance are satisfied. This raises even more concern for BWCs as very little data has been collected on officers’ opinion of this new technology. The purpose of this research study is to examine how opinions of BWCs have changed as a result of its implementation throughout the city of Chicago and how this may be correlated to shifts in job satisfaction and officer burnout. Specifically, I believe that those with more positive opinions of BWCs will have an increase in job satisfaction and a decrease in burnout. In this study, Chicago Police Department (CPD) officers were surveyed before and after the implementation of BWCs. They completed several measures including opinions on BWCs, overall satisfaction, and burnout. The results indicated that the experimental districts had a significant increase in positive opinions of BWCs, overall satisfaction increased, and overall burnout decreased after the implementation.

268. Tsolova, Vassilena

**Effect of Cigarette and E-cigarette Toxins on Ciliary Activity**

*Undergraduate - Biological Sciences*

Electronic cigarettes, or e-cigarettes, are marketed as a safer alternative to cigarettes, and as a tool to discontinue smoking. In the United States, it was estimated that 3.7 percent of adults used e-cigarettes in 2014, and that 12.6 percent of adults had tried e-cigarettes (Schoenborn, 2015). The popularity of e-cigarettes is increasing among American adults, particularly among teenagers and young adults. In 2014, more adolescents who smoked chose e-cigarettes over cigarettes (Panitz et al., 2015). Despite the increased use of e-cigarettes in the United States, there is limited research describing the health impacts caused by e-cigarettes. Prior research has found that e-cigarettes produce a variety of harmful toxins, including formaldehyde-containing hemiacetals (Panitz et al., 2015). Therefore, e-cigarettes may not be as safe as commonly believed. My project aims to compare the ciliary inhibition caused by cigarettes and e-cigarettes by exposing Tetrahymena cells to cigarette and e-cigarette extracts and measuring the cilia density and length using immunofluorescence staining. In humans, cilia are an important organelle in the lower respiratory tract because they eliminate unwanted pathogens and other...
obstructions that are inhaled by sweeping them towards the mouth. When cilia are inhibited, chronic airway diseases can occur (Bustamante-Marin, 2016). I am using Tetrahymena cells to study ciliary activity because each Tetrahymena cell is covered with approximately one thousand cilia (Rajagopalan, 2009). The structural composition of Tetrahymena cilia is also similar to human cilia as they are both composed of microtubules that are arranged in a 9+2 axonemal structure (Ishikawa, 2016). I predict that if e-cigarette extract is more damaging to cilia, then cells treated with e-cigarette extract will exhibit fewer and shorter cilia compared to cells treated with cigarette smoke extract.

269. Tummala, Apoorva and Cordoba-Chacon, Jose

Hepatocyte PPARγ regulates intestinal fat absorption and hepatic clearance of postprandial triglycerides.

Undergraduate - Endocrinology, Diabetes and Metabolism

Peroxisome proliferator-activated receptor gamma (PPARγ), is a nuclear receptor that regulates fatty acid (FA) metabolism and storage among other functions. Aged hepatocyte-specific PPARγ knock-out mice show postprandial dyslipidemia which might be due to impaired clearance of chylomicron remnants. However, the hepatocyte PPARγ-regulated mechanism/s that control postprandial lipid homeostasis are poorly understood. To isolate these mechanisms, we have generated adult onset hepatocyte-specific PPARγ knockout (aHepPPARγKO) mice that allowed us to study the impact of loss of hepatocyte PPARγ shortly after knocking out PPARγ expression. Briefly, 10 week-old PPARγfl/fl mice were injected intravenously with adeno-associated virus serotype 8 that bears a thyroxine binding globulin promoter driven Cre recombinase (AAV8-TBGp-Cre). AAV8-TBGp-Cre treated PPARγfl/fl mice are aHepPPARγKO mice. AAV8-TBGp-Null treated PPARγfl/fl mice are control mice. One week after AAV treatment, chow-fed aHepPPARγKO mice showed elevated postprandial triglycerides (TG) as compared to controls. Fasted control and aHepPPARγKO mice were given an oral gavage of olive oil without or with tyloxapol, which blocks lipoprotein-lipase mediated TG clearance, and we found that elevated plasma TG in aHepPPARγKO mice may be due to increased intestinal lipid absorption, but also to impaired clearance of chylomicron remnants. Therefore, we gave a second gavage of olive oil that contains TG-17:1 (10% v/v) which was used as a tracer since 17:1 is a FA not present in commercial olive oil or synthesized in the body. Then, we measured the levels of all the FA in plasma, liver and heart of aHepPPARγKO mice using gas chromatography/mass spectrometry. Plasma total FA and 17:1 levels were increased in aHepPPARγKO mice as compared to controls. However, the levels of total and specific FA, including 17:1, were not increased in liver or heart of aHepPPARγKO mice. In summary, these results suggest that hepatocyte PPARγ regulates mechanism(s) that inhibit intestinal fat absorption and tissue-specific TG uptake.
270. Tylor, Kaitlyn and Federle, Michael

**The Activity of Rgg Transcriptional Regulators During Quorum Sensing in Streptococcus Pyogenes**

*Graduate / Professional - Microbiology and Immunology*

Rgg proteins are a class of peptide pheromone-binding transcriptional regulators found in the cytoplasm of most genera of Firmicutes. In Group A Streptococcus (GAS), Rgg2 and Rgg3 proteins regulate the transcription of genes involved in moderating group behaviors such as biofilm formation, lysozyme resistance, and cell aggregation, in a process known as quorum sensing (QS). Addition of a short hydrophobic peptide (SHP) induces QS-related genes by altering the function of the individual Rgg transcriptional regulators. Interestingly, Rgg2 and Rgg3, though highly similar proteins, display opposing activities in transcriptional regulation; Rgg2 is a transcriptional activator, whereas Rgg3 is a repressor. The aim of this project is to investigate the properties of these Rgg proteins, including peptide binding, DNA binding, interactions with RNA polymerase, and oligomerization. Random and site-directed mutagenesis have been used to investigate functional regions of the proteins, by creating chimaeric Rgg2/Rgg3 proteins that can be assayed for transcriptional activity, DNA binding affinity, and oligomeric state. In addition, we will use in vitro transcription assays to explore Rgg2 interactions with RNA polymerase. Rgg2 contains a disulfide bond that potentially functions as a redox sensor; we intend to use transcriptional reporter assays to examine the role of the disulfide bond in oxidizing and reducing conditions. Understanding how Rgg proteins function will advance our understanding of QS in GAS and other pathogenic members of the phylum Firmicutes, and improve efforts to interfere with QS and therefore manipulate bacterial behavior for therapeutic purposes.

271. Udoetuk, Stella

**Social Justice Framework for Teaching Pre-Health Students**

*Undergraduate - Biological Sciences*

A framework was developed with the intended goal of teaching social justice in the sciences to pre-health students by introducing cultural competency and social justice through the perspective of access and equity for underrepresented populations. This study focuses on an undergraduate organic chemistry lab course for pre-nursing students, which aims to teach about carbohydrate chemistry. In accordance with the framework, students in this lab are responsible for developing tests for sucrose intolerance that may be more clinically relevant for a target population. Sucrase-isomaltase (SI) deficiency, though relatively rare, is disease that affects nearly 5-10% of the Inuit population with symptoms appearing during infancy through early childhood ages. Diagnostic testing involves collection of bowel samples, which is often an invasive procedure, especially for young children. However, research has found genetic sequencing to be better a option for diagnosing SI deficiency as it only requires a blood sample. Students in this lab will apply their understanding of the Inuit population as a case study to comprehend how culture and diet are
affected by rare diseases. In agreement with the framework, students will compare their cultural diets to that of the Intuits and of the other student in the class, as well as understand how the Inuit diet is affected by availability, culture, and Western influences. Measurements through coding of student lab artifacts was used to gauge students’ understanding of carbohydrate chemistry and social justice. The framework guided to questions students answered in an in- and post-laboratory question, as well as the evaluation and coding of the student responses. Through coding of these lab artifacts, we were able to assess which students not only understood the carbohydrate chemistry, but also which students were able to apply their understanding to this cultural competency aspect of the lab.

272. Varas, Gonzalo; Paralkar, Shivani; Wang, Shuaijie and Bhatt, Tanvi

Gait adaptation to a Real Life Virtual Environment is Transferred to Different Proprioceptive Conditions in Young Adults Subjects

Graduate / Professional - Physical Therapy

The purpose of this study was to investigate how the kinematic adaptation to a two-different virtual reality (VR) environment during overground walking is transferred to a task where the same virtual environments were applied to healthy young participants during treadmill walking.

Methods: 15 healthy young participants completed this study protocol. Each participant had to walk on a 7m walkway for 4 trials each of baseline natural walking (NW) and walking under 2 different virtual environments, i.e. snowy environment and crowded environment wearing a head-mounted VR device. After the block trials, subjects experienced a mixed block consisting of random exposure to both virtual environments and natural walking. After the overground trials participant were asked to walk in a treadmill experimenting the same protocol. The following gait parameters were analyzed for each trial: Excursion angle of the COM, medio-lateral (ML) peak excursion of the COM, and step length. One-Way Repeated-Measures ANOVA was performed with bonferroni post-hoc tests. Results: Compared to the baseline walking trials excursion angle and peak ML-COM excursion were significantly greater on the first trial of the snow and crowd conditions (p< 0.05). The excursion angle and peak ML-COM excursion increased significantly from the 1st to 4th snow trials (S4>S1) while they decreased in the crowd conditions (C4<C1). No differences were observed after mixed trials. During treadmill trials, same results were observed during snow (p< 0.05) and crowd (p< 0.05) condition compared with treadmill baseline trials. Discussion: These results allow us to point out that the sensorimotor adaptation generated as a result of the interaction of young adults with different virtual environments used in our study is maintained, and also transferred even to conditions of proprioceptive stimulation that differ from the which the sensorimotor adaptation process was acquired.
Loss of PAX2 in Fallopian Tube Epithelium Recapitulates Human SCOUTs

*Undergraduate - Biological Sciences*

It is predicted that ovarian cancer will affect more than 22,000 women within the year. The deadliest form of the disease is high grade serous ovarian cancer (HGSOC). A majority of these lesions originate from the fallopian tube epithelium after manifesting as a pre-cancerous secretory cell outgrowth (SCOUT) followed by transformation and implantation onto the ovarian surface epithelium. Recently, SCOUTs have been divided into 2 subgroups: type 1 SCOUTs tend to remain benign unlike type 2 Scouts have a tendency to progress toward malignancy. PAX2 is a developmental regulatory transcription factor that is lost in both HGSOC and SCOUTs. This conserved genotypic aberration indicates that it has a prominent role in the development of HGSOC. The objective of this study is to elucidate how the loss of PAX2 potentiates the FTE to progress into malignancy. We modeled PAX2 deficiency into murine oviductal epithelial (MOE) cells with either a stable PAX2 shRNA knockdown to explore partial PAX2 loss or PAX2 CRISPR/CAS9 knockout to study cells with complete loss of PAX2. Loss of PAX2 in MOE cells, regardless of the level of PAX2 deficiency, lead to no significant cancer specific phenotypic changes including adhesion, migration, and proliferation; this observation is typical of a benign pre-cursor lesion. However, RNA sequencing of PAX2 shRNA cells revealed a transcriptional overhaul that resulted in a mRNA expression pattern similar to human SCOUTs. Moreover, the RNAseq and qPCR validation showed that PAX2 deficient MOE cells more closely matched the unique transcriptional fingerprint of type 2 SCOUTs over type 1 SCOUTs. Further analysis of these key genes by western blot revealed that these changes continued to manifest at the protein level. In summary, loss of PAX2 in early lesions does not manifest itself in transformative phenotypes, but rather in potentiating changes in the transcriptome.

Diet Quality and Nutrient Intake of Urban Overweight and Obese Older Adults with Osteoarthritis

*Undergraduate - Kinesiology and Nutrition*

A healthy diet may help to prevent or halt the progression of chronic diseases contributing to overall health, independence, and quality of life as people age. Few studies have examined nutrient intake and diet quality in racially/ethnically diverse populations. Using the Healthy Eating Index-2010 (HEI-2010), this study examined the nutrient intake and diet quality of urban overweight/obese primarily African American older adults with self-reported osteoarthritis (OA). Associations between sociodemographic and health-related factors and diet quality was explored. Four-hundred participants (mean age 67.8 years, SD 5.9) were included. Habitual dietary intake was assessed using a food frequency questionnaire (FFQ). Nutrient intake and diet quality were calculated from the FFQ. Results indicated diet quality needs improvement based on HEI-2010.
mean total score of 66.3 (SD 10.5). Age, body mass index, education (multivariable model only) and OA severity (bivariate model only) were significant predictors of HEI-2010 total score in linear models. Mean intake for fiber, calcium and vitamin D was below recommendations, while intake of total fat and sodium exceeded recommendations. These findings offer important information for tailoring interventions and public health messaging in an effort to achieve optimum dietary intakes that can help to prevent chronic diseases as individual’s age.

275. Villanueva, Ulani; Max, Berhelhammer and Horswill, Craig

**Case Study of Total Daily Energy Expenditure using Doubly Labeled Water**

*Undergraduate - Kinesiology and Nutrition*

Purpose: The purpose of this study was to validate the doubly labeled water (DLW) method of quantifying total daily energy expenditure (TDEE-DLW). Using cavity ring-down spectroscopy (CRDS), we analyzed tracer enrichment in urine samples collected over 13 days from two subjects who received doses of the tracers. We compared tracer estimates with independent estimates of TDEE (TDEE-IND). We hypothesized that TDEE-DLW values would be within 10% of TDEE-IND. Methods: One diver (high-intensity, low-volume training) and one distance swimmer (lower intensity, higher-volume training) were studied. After collecting baseline urine, the swimmer ingested 6.80 g of D2O and 12.00 g of 18O-water; the diver ingested 7.45 g of D2O. Urine samples were collected 4 hours post ingestion and 13 days later, and assayed for tracer enrichment using CRDS. TDEE-DLW was calculated using the two-point method (Schoeller 1988). Resting metabolic rate was measured at the time of the tracer dosing. Subjects used i-Phone or Fitbit technology to track movement during the 13-day period, and kept logs of training. Subjects completed two 24-hour recall food records to estimate daily energy intake (EI) and the thermic effect of feeding (TEF, 10% of EI). We compared the methods for assessing TDEE and energy-flux components of the athletes. Results: Only the distance swimmer received DLW because of 18O-water costs; however, the diver was tested for all other variables including naturally occurring 18O-water to confirm a consistent background over 13 days. For the swimmer, TDEE-DLW was 3547 kcal/day. His daily expended based TDEE-IND was 3240 kcal/day. The diver’s TDEE-IND was 3067 kcals/day. For EI, the swimmer consumed 3834 kcal/day and the diver consumed 2794 kcal/day. Conclusion: TDEE-DLW was within 9% of TDEE-IND. We expected a higher TDEE for the swimmer but tapering during the 13-day period reduced the DLW average.

276. Walker, Cassandra

**Exploring the Relationship Between Pain Tolerance and Empathy**

*Graduate / Professional - Social Sciences*

Empathy, a person’s ability to feel as another would, is vital to social work practice (Gerdes, Segal, Jackson, & Mullins, 2013). Simulation Theory suggests that shared neural pathways
between action and perception are responsible for empathy, while Theory-theory endorses naïve theories revised through experience (Zahvi, 2010). This study incorporates both theories suggesting that one’s pain tolerance could affect their empathy, as the neural coding is the same and one’s own experience will inform their understanding of others. This investigation explored how pain tolerance, measured by the Cold Pressor Test (CPT), impacts individual empathetic ability. Conducted from December 2012 to February 2013, this study included 60 participants from a private, Midwestern university. Contextualized within a multidimensional approach (Davis, 1980), empathy was measured by the Interpersonal Reactivity Index (IRI), a validated, 28-item self-report questionnaire that examines four empathy constructs (e.g., fantasy, personal distress, empathetic concern, perspective taking) on separate subscales. A person’s emotional state, or affect (Watson & Clark, 1988), and individual identity dimensions (Ickles, 2009) are linked to empathetic differences. Therefore, the Positive and Negative Affect Schedule (PANAS), a 20-item self-report affect measure, and collected demographic data were incorporated to control for identity-based differences. Hierarchical multiple regression models were employed to determine the layered effects of demographic identity, PANAS, and CPT on each IRI subscale. The IRI-Fantasy model was the most predictive ($R^2 = 17.4\%$), and Sex ($p = .040$) and Negative PANAS ($p = .017$) were statistically significant. CPT decreased model predictability across IRI subscales and was not statistically significant. This pattern suggests that more data are required when adding a pain tolerance measure to determine equitable model predictability. Study limitations include a small sample size with notable sample homogeneity. Defining the relationship between empathy and pain tolerance requires further study as a link could help social workers enhance interactions with clients.

277. Walker, D’Andre

Understanding Variation of Scores in the CLASS Measure

Undergraduate - Psychology

Identifying and understanding variation in scores is important because the standard CLASS scoring computes the simple mean of CLASS cycles, implying that this central tendency is the best signal of quality. Yet, these means might mask important variation in scores. Understanding when and why CLASS scores vary across cycles may lead to alternative scorings that better capture or account for such variability. I hypothesize that the CLASS Measure, particularly the Regard for Student Perspective dimension, will exhibit considerable variation within and between days. I analyzed coding values from 170 15-minute cycles in four pre-school classrooms located in two different cities. By comparing each classroom’s individual scores to its mean score, I isolated values that fell more than one standard deviation from the classroom’s mean. Extreme values comprised from 16.9% to 37.5% of cycles across four classrooms. To identify correlates of these extreme values, I looked at codes of the activities that were happening during each cycle. These activities include structured events such as whole group activities and unstructured activities such as centers. I found that cycles when students are doing whole group activities, in centers, having snack time, or transitioning between activities there is a greater
likelihood for extreme scores. In addition, a cycle that contains a combination of any of these four activities increases the likelihood for an extreme score. Inspecting the CLASS manual suggests the ways in which the scoring guidelines for Regard for Students Perspective may be difficult to meet during certain activities and in transitions between activities. Further research using more classrooms could replicate and confirm these trends. The analysis might also be replicated with other CLASS dimensions to identify the extent of variation in their scores and correlates of such variation. Identifying and understanding variation in scores is important because the standard CLASS scoring computes the simple mean of CLASS cycles, implying that this central tendency is the best signal of quality. Yet, these means might mask important variation in scores. Understanding when and why CLASS scores vary across cycles may lead to alternative scorings that better capture or account for such variability. I hypothesize that the CLASS Measure, particularly the Regard for Student Perspective dimension, will exhibit considerable variation within and between days. I analyzed coding values from 170 15-minute cycles in four pre-school classrooms located in two different cities. By comparing each classroom’s individual scores to its mean score, I isolated values that fell more than one standard deviation from the classroom’s mean. Extreme values comprised from 16.9% to 37.5% of cycles across four classrooms. To identify correlates of these extreme values, I looked at codes of the activities that were happening during each cycle. These activities include structured events such as whole group activities and unstructured activities such as centers. I found that cycles when students are doing whole group activities, in centers, having snack time, or transitioning between activities there is a greater likelihood for extreme scores. In addition, a cycle that contains a combination of any of these four activities increases the likelihood for an extreme score. Inspecting the CLASS manual suggests the ways in which the scoring guidelines for Regard for Students Perspective may be difficult to meet during certain activities and in transitions between activities. Further research using more classrooms could replicate and confirm these trends. The analysis might also be replicated with other CLASS dimensions to identify the extent of variation in their scores and correlates of such variation.

278. Walte, Samantha

**Selected for Segregation: Predictors of Special School Placement for Students with Intellectual and Developmental Disabilities**

*Graduate / Professional - Special Education*

Despite evidence that inclusive education leads to better outcomes (e.g., Ryndak, Jackson, & White, 2013) and that self-contained education does not deliver on the expectations of its proponents (Causton-Theoharris, Theoharris, Orsati, & Cosier, 2011), students with IDD continue to be excluded (Morningstar, Kurth, & Johnson, 2017). This exclusion is exacerbated by other sources of inequity such as socioeconomic status (SES) and ethnicity (e.g., Kurth, Mastergeorge, & Paschall, 2016). A national dataset was used to identify predictors of segregated placement for students with intellectual and developmental disabilities beyond the nature and severity of their disability (e.g., socioeconomic status, ethnicity). This presentation
will cover interpretation of IDEA’s least restrictive environment language, underlying sources of inequity, and actions to address them including culturally-responsive intensive interventions for this particular group of students. Using descriptive statistics, Chi square tests, and multiple logistic regression modeling, patterns and predictors were identified and then compared with other groups of students. Additional analyses continue to be run for confirmation but preliminary results suggest that race, SES, and community type significantly predict the placement of students with IDD and that those variables do influence the effect of manipulable variables such as related services receipt and parent involvement. Discussion points will include how practitioners can work to uphold equity for students with IDD in vulnerable groups as well as what researchers can do to equip practitioners with the tools to help them do so.

279. Wang, Yiru; Wang, Shuaijie and Bhatt, Tanvi

**Obstacle-induced trip perturbation training: proactive and reactive adaptation to reduce falls in community-dwelling older adults**

*Graduate / Professional - Physical Therapy*

Backgrounds. Trip-related falls constitute 60% falls in community-dwelling older adults. Previous evidence from healthy young adults indicated a training effects of obstacle-induced-trips to reduced laboratory-induced falls. This study was to investigate if and to what extent healthy older adults could adapt to such trip-perturbation-training. Methods. Twenty older adults aged over 60 were exposed to twenty-four obstacle-induced trips -Block1 and Block2 comprising repeated trips (T1-T8 and T9-T16) with followed by Block3 mixing eight trips and walking trials (T17-T24). A trip (Ret_T) was given 30 minutes after Block3 as an immediate retention test. Post-trip center-of-mass (COM) stability and motion states (i.e., velocity and position) (STA_POST, COM_VEL, COM_POS), maximum trunk angle (MAX_TRUNK), recovery step length (SL_REC) and pre-trip toe clearance (ToeC) were reported to indicate reactive and proactive adaptive changes, respectively.

Results. On their first novel trip, 60% older adults fell. Subsequently, fall rate rapidly dropped down to 35% on T2 and 5% by T8 with 0% fall on T24. The decreasing in fall rate correlated with reduced STA_POST from T1-T8 (T8>T1). After the washout walking trials, STA_POST increased (T9<T8). However, it decreased rapidly again during Block2 (T16>T9) and then was maintained throughout Block3 (T16=T24, p>0.05). Such improvements in STA_POST could have resulted from decreased forward COM_VEL (T8<T1) and COM_POS (T8<T1). In addition, MAX_TRUNK were reduced through T1-T24 (p<0.05). These reactive changes were accompanied by proactive changes with an elevated ToeC (T1<T24) such that 50% participants crossed over the obstacle without hitting it on T24. Both proactive and reactive adaptive adjustments diminished the need for taking longer compensatory steps (SL_REC: T1>T24, p<0.05). The training effects were retained on Ret_T that there was no difference on the fall outcomes, SL_REC and ToeC between T24 and Ret_T. Conclusion. The 8-cm-obstacle-induced-trip successfully and safely reproduced falls among older adults, who could acquire similar adaptations as young adults.
280. Ward, Emma; Nguyen, Duc and Givogri, Maria Irene

**Sulfatides Treatment of Oligodendrocyte Precursors Indicate a Potential Up-Regulation of the Notch-1 Signaling Pathway**

*Undergraduate - Anatomy and Cell Biology*

Oligodendrocytes (OLs) are vital support cells in the brain, responsible for generating the myelin sheath that insulates and protects neuronal axons. Maturation of OLs is characterized by cell-specific protein expression at progressive lineage stages. Sulfatides are naturally abundant membrane lipids, particularly enriched in mature OLs and myelin sheaths. Sulfatide dysregulation is implicated in many neurodegenerative diseases associated with demyelination. It has previously been shown that accumulation of sulfatides prevents differentiation of multipotential neural precursors into OLs through dysregulation of PDGFR-alpha receptor. In this project, we hypothesized that sulfatides act in demyelinating conditions to block OL differentiation through up-regulation of the Notch-1 signaling pathway. The Notch-1 protein is similarly a receptor that is highly active in proliferative, immature OLs. A characterization of OLs were conducted using immunochemistry methods to identify changes in protein and lipid expression between control and sulfatides treated cultures through both qualitative and quantitative analyses. OLs were enriched from a culture of mixed primary glial cells derived from post-natal day 1-3 aged C57BL6 mice and were optimized along the cell specific stage markers NG2, OLIG2, A2B5, and O4. A paradigm tested was the addition of two consecutive 24-hour pulses of 10 µM porcine brain sulfatides. This treatment appeared to induce an up-regulation of Notch-1 expression that seemed to contribute to a shift in the normally highly heterogeneous populations of OLs towards more immature stages, characterized by what appeared to be an increase in populations expressing the A2B5, NG2, and Cyclin E markers. These data support our hypothesis of sulfatides stunting proper OL differentiation, in part, through up-regulation of the Notch-1 signaling pathway. Further studies will elucidate the finer cellular mechanisms involved. Our project served as a preliminary step in the effort to understand the role of sulfatides in demyelinating conditions, in the overall pursuit of combating demyelination.

281. Warren, Zachary

**Mobile Application Based for Patients Adherence of Oral Anti-Cancer Medications**

*Undergraduate - Biomedical and Health Information Sciences*

Objective: The objective of the study is to improve the patient’s medical understanding of the oral anti-cancer medications (OAMs) and their regimen. Often times a regimen, how to take, when to take, can get lost in communication, or be difficult to understand. The mobile application is designed in a way to simplify the difficulties of taking the OAMs. Methods: The user-friendly application was designed by the research team from patients advocates help.
Shortly after recruitment, the patient interacted with the application of their own specific case for feasibility. The application is designed for all styles of learning, as the application has audio voice-overs, text (6th grade reading level), animations, and pictures. Furthermore, equipped with possible complications of possible side effects, scheduling and regimen of when to take OAMs, dosage amount, and dosage refill from actual case studies. Abiding by all state and federal laws, the application is used through Health Insurance Portability and Accountability Act (HIPAA) to ensure the safety and security of the patient’s information and regimen. Important feedback was derived from the patients upon completion of the study, and applied for further use. Results: The Results from 20 patients from UI hospital patients is ongoing. We are actively recruiting patients from the oncology department. Unfortunately, we have had 2 days of unsuccessful recruitment. Implications: The application is specific for each person as to adjust to their unique needs. Although, not guaranteed for every patient, the application should be of great benefit to the patient. With continuing use of the application, we hope to see an increase in medical understanding, patient-physician communication, and overall health results.

282. Weishaupt, Lynn

**Assessment of Quality of Life for Sexual Assault Crisis Workers**

*Undergraduate - Psychology*

Sexual assault crisis workers are under constant stress to serve victims to the best of their ability. Often times they are overworked and do not practice self-care. It is important to examine how a sexual assault worker is functioning in their work environment as a crisis helper and how it affects their quality of life. The ProQOL was used to measure levels of Compassion Satisfaction, Burnout, and Secondary Traumatic Stress/Compassion Fatigue (ProQOL R-IV professional quality of life scale, 2007). Once the positive and negative symptoms of being in a helping profession are understood, it can improve the quality of help as well as the ability to engage in self-care. The other measure being used is the Secondary Traumatic Stress Scale. Bride et al. (2004) reported a measure of three domains of traumatic stress specifically associated with secondary exposure to trauma: intrusion, avoidance, and arousal, all in which the STSS measures with high levels of internal consistency reliability. The sexual assault center can use the results in order to implement new training. Both of the scales will be administered throughout the sexual assault center. Differences among groups can be expected due to the fact that there are different levels of trauma exposure associated with different positions. Correlations between the measures may illustrate the differential effectiveness of each measure within this urban diverse agency.

283. Welter, Quinne

**Community Resistance to Gentrification: The Pilsen Neighborhood in Chicago**

*Undergraduate - Political Science*
Gentrification can be seen as a process that can help improve a neighborhood that is considered to be undervalued, but it can also push out the original inhabitants and force changes in the neighborhood whether that change was warranted or not. The common negative aspects of gentrification are that the initial community is forced out of their homes and businesses due to higher rent, schools close as new residents with smaller families move in, and new higher-end businesses open up that the surrounding community cannot afford. Pilsen, a longstanding Mexican neighborhood in Chicago is currently undergoing the gentrification process, but Pilsen has been able to withstand and resist many of the negative aspects of the process. Many neighborhoods have been drastically transformed by gentrification within a few years, meanwhile in Pilsen, developers and machine politicians have been trying to get their share of Pilsen to begin the gentrification process, but they have been met with community resistance. Local groups and neighbors have banded together to resist gentrification so that they can stay in their homes. Unfortunately, many of the original inhabitants have nonetheless been pushed further west and further south, where they face more violent neighborhoods with fewer educational and economic resources. But the Pilsen community is doing what they can to fight the process of dislocation and reclaim residents’ control of their neighborhood. They are rallying the community and attempting to elect new local city officials who will be more responsive to the original residents’ claims to the neighborhood. There are many resistance tactics, like protests, hosting community gatherings, and challenging the developers and politicians, that the community has successfully been able to use to elongate the gentrification process. This research project will focus on these gentrification resistance efforts within the Pilsen community in Chicago. I will collect my data through interviews with Pilsen residents and community leaders, I will also use scholarly sources and archival data (including newspaper coverage) to collect historical research about Pilsen and the gentrification issues there. This project intends to help raise awareness of the possibility for communities to resist the negative effects of gentrification, and help people become more aware of how to strengthen community bonds in order to manage change.

284. White, Zachary; Tummala, Apoorva; Dhavamani, Sugasini; Yagalaa, Poorna CR.; Kineman, Rhonda D.; Subbaiah, Papasani V. and Cordoba-Chacon, Jose

Mice Fed a Diet that Contains trans10/cis12-conjugated Linoleic Acid Develop Lipodystrophy and Hepatic Steatosis but can Control Glucose Levels.

*Undergraduate - Endocrinology, Diabetes and Metabolism*

trans-10/cis-12 (t10c12)- and cis-9/trans-11 (c9t11)-conjugated linoleic acids (CLA) are present in dairy products and are used as dietary supplements for weight control. Earlier reports showed that c9t11-CLA prevents insulin resistance whereas t10c12-CLA promotes insulin resistance, because t10c12-CLA promotes the mobilization of fatty acids from adipose tissue to the liver. In this study, we sought to compare the impact of dietary t10c12- and c9t11-CLA on hepatic and systemic metabolism. We fed adult C57Bl6/J male mice with diets containing 0.8% t10c12- or c9t11-CLA for 9 or 35 days. While we did not observe any changes induced by c9t11-CLA diets,
mice fed a t10c12-CLA diet showed a dramatic reduction in fat mass that rebounded by 35 days. This rebound in fat signal (by NMR) was due to hepatic steatosis. Mice fed t10c12-CLA diet lost their adipose tissue after 9 days of diet, that was not associated with an increase in lipolytic genes or plasma non-esterified fatty acids. Afterwards, mice fed t10c12-CLA did not show detectable amount of adipose tissue, and they were insulin resistance as assessed by their response to a bolus of insulin ip (insulin tolerance test) and plasma insulin levels. However, blood glucose levels and ability to clear glucose after an ip injection of glucose in mice fed t10c12-CLA was normal. Interestingly, mice fed t10c12-CLA diet showed increased proportion of monounsaturated fatty acids and reduced proportion of polyunsaturated fatty acids in the liver. In addition, mice fed t10c12-CLA diet showed increased expression of hepatic lipogenic genes and a reduction in hepatic gluconeogenic genes by 35 days. Taken together, these data suggest that the livers of mice fed t10c12-CLA remain sensitive to the actions of insulin because dietary t10c12-CLA alters hepatic glucose and lipid metabolism following the reduction of fat mass in mice.

285. Whiteside, Mary

**Schizophrenia and Hallucinations: How Culture Influences the Content and Perceptions of Mental Disorders**

*Undergraduate - Neuroscience*

Schizophrenia is characterized by a series of positive and negative symptoms – the most obvious of which are hallucinations. Hallucinations are defined as false perceptions that occur in the absence of actual stimuli, and they can take many forms, such as visual, auditory, and tactile perceptions. These symptoms of schizophrenia are frequently isolating to affected individuals, distorting the way they interact with the rest of the world. Hallucinations are extremely complex experiences that involve biological, psychological, and environmental factors. The objective of this investigation is to take a look at existing studies that have been done on the content of hallucinations across cultures and explore not only hallucination content, but also their cultural significance, or how they are perceived by their respective communities. Preliminary investigations have shown that hallucinations are deeply influenced by culture and there exist differences in the cultural meanings, rates, and content of hallucinations in clinical and non-clinical populations. For example, Americans with schizophrenia are more apt to report themselves as “crazy” and describe aggressive and violent hallucinations; however, other cultures, such as those in Ghana or India, have more positive relationships and experiences with their hallucination experiences (Luhrmann, 2014). These recorded differences can also be used in clinical treatment settings in order to take into account the assessment and treatment of hallucinations, if individuals even believe their hallucinations are worthy of medical treatment. Further investigation of these cultural differences will look at how these results interact with psychiatric treatments and any existing gaps in current research being done.
286. **Williams, Brittney**

**Parental Meta-Emotion Philosophies and Emotional Socialization in African American Children: Impact on Children’s Social Skills**

*Graduate / Professional - Educational Psychology*

Preparing a child for the world is an enormous undertaking. Parents are tasked with engaging in various forms of socialization to prepare their children for the world. One such form is emotional socialization. This process of teaching one’s child(ren) about emotions is influenced by the parents’ own emotional experiences. The current study examined emotional socialization among 51 African American parents (e.g., biological mothers and fathers) and their young children (five to seven years old) from low to upper income backgrounds. The parental meta-emotion philosophies (PMEP) framework was used to measure how parents deal with their own emotions, and how they engage in emotional socialization practices with their children. Three conceptual models were used to test the potential mediation relationship between parental emotional socialization, child emotional competence, and child social skills of their young children. Contextual variables (i.e., parent ethnic identity, income level, and parental satisfaction) and gender were also included in the models to gain a broader understanding of how African American parents engage in emotional socialization. Structural Equation Modeling (SEM) was used to analyze the three proposed conceptual models. Overall, fit indices revealed poor model fit for the three proposed models. The mediation relationship tested within the conceptual model was also insignificant. However, certain paths presented some interesting findings. Ethnic identity, parent gender, and parental satisfaction were found to have significant relationships with parents’ emotional socialization practices. Parents’ emotional socialization practices of certain emotions had a significant relationship with children’ emotional competence and social skills. Unexpectedly, a negative relationship existed between child language skills and emotional competence. Child emotional competence proved to be a significant predictor of child social skills. There will be a discussion of the implications of the study’s findings.

287. **Wolfman, Mark; Yu, Young-Sang; May, Brian M.; Lebens-Higgins, Zachary; Sallis, Shawn; Faenza, Nicholas; Pereira, Nathalie; Shirato, Nozomi; Rose, Volker; Shapiro, David A.; Amatucci, Glenn; Piper, Louis F.J. and Cabana, Jordi**

**Nano-scale Chemical Imaging of Lithium-Ion Battery Cathodes**

*Graduate / Professional - Chemistry*

Today’s lithium-ion batteries operate well below their theoretical performance limits in order to assure long life-spans and to avoid catastrophic failures. A thorough understanding of the underlying degradation processes of the material is necessary in order to overcome these limitations and unlock the full capacity of modern cathode materials. X-ray spectroscopy provides a means of investigating these processes by directly probing the chemical state of the material. By coupling X-ray spectroscopy with several X-ray microscopy techniques spanning a range of spatial resolutions, we have uncovered chemical inhomogeneities that occur within
LiNi0.8Co0.15Al0.05O2 (NCA) particles, a layered cathode material used in high-performance applications, such as electric vehicles. This spectro-microscopy technique generates a large number of independent spectra, which enables advanced statistical analyses. The relative abundances of the various states are then mapped within individual particles at several states of charge. Additionally, a novel X-ray enabled tunneling electron microscopy technique provides a spatially resolved chemical probe that is sensitive to the first few atomic layers of the particle. Comparing measurements from bulk to nanometer length-scales provides insights that are not accessible when considered separately.

288. Wright, Dorothy

**UIC & Chicago Park District Monitor Lake Michigan Water Quality Using qPCR Analysis**

*Undergraduate - Biological Sciences*

During the summer 2017 beach season, UIC School of Public Health [Environmental Occupational Health Sciences] and the Chicago Park District collaborated for recreational water quality monitoring using qPCR techniques. The aim of this study was to monitor twenty beaches selected and monitored for seven days per week. The purpose of this study was the use of qPCR for water quality monitoring as the first of its kind in the U.S. in cutting-edge water quality management. qPCR allows for accurate, real-time, and prompt results of Environmental Protection Agency (EPA) Beach Action Value (BAV) notifications. A total of 2,040 = 20 beaches x 102 beach-days was monitored. Water quality results were available for 1,980 beach-days, 97.1% of the total beach-days. Results were not available for all twenty of the selected beaches on all beach monitoring days. Some samples were inhibited or unable to provide reliable results on 60 beach-days. Inhibition may be caused by some natural freshwater biome environmental factors (e.g.; sand, soil, seaweed, insects). In addition, turbidity, cloudiness of water due to the presence of micro-environmental particles, is correlated to inhibition. Proper training of Chicago Park District staff in water sampling standard operating procedures reduced contaminated samples; with this reduction in contamination, unusable samples decreased significantly. The use of qPCR for recreational water quality management has proven to be an effective and important public health resource tool.

289. Wu, Lisha and Khodadoust, Amid

**Removal of Chromium from Water using Manganese Oxide Based Adsorbents: Adsorption of Cr(III) and Cr(V)**

*Graduate / Professional - Civil and Materials Engineering*

The removal of chromium from water down to the standard level should be achieved in an effective manner using a technology, which is relatively simple and inexpensive. Various technologies for the removal of chromium from water including ion exchange, reduction/filtration/precipitation and membrane processes have been used. Hexavalent chromium
may be removed from water using adsorption. Adsorption is regarded as a relatively simple and effective technology with low-moderate cost among technologies for the removal of heavy metals from water. A wide range of adsorbents has been considered for adsorption of chromium including activated carbon, natural fibers, agricultural and industrial wastes, clays, zerovalent iron, metal oxides and hybrid adsorbents. Metal oxides have been employed as the most widespread adsorbents of heavy metals, where either electrostatic interaction or formation of complexes between chromium and the metal oxide surface groups may lead to adsorption of the heavy metal species onto the metal oxide. Manganese oxide based adsorbents have the potential to be effective absorbents for the removal of chromium from water due to their exchange capacity and selectivity towards toxic heavy metal ions. A sorbent can be a sustainable and cost effective sorbent if it can be reused in multiple cycles of operation. Modifying the procedure of synthesizing the manganese oxide coated sand to get a re-usable and re-generable sorbent is another focus of this project. In this research project, we plan to synthesize the MCS sorbent as an efficient, applicable and inexpensive sorbent for removal of chromium from water and then investigate the interactions between chromium species with manganese oxide at solid/solution interfaces.

290. Yabe, Manako

**Healthcare Providers’ and Deaf Patients' Perspectives toward Video Remote Interpreting: A Mixed Methods Study**

*Graduate / Professional - Disability and Human Development*

Many hospitals have popularized the use of Video Remote Interpreting (VRI). This study identifies and compares the preferences and priorities of providers and deaf patients toward VRI and in-person interpreting. The study utilizes a mixed methods approach of a quantitative online survey for providers and deaf patients to learn about their preferences regarding VRI versus in-person interpreting, as well as qualitative interviews with providers and deaf patients. Based on study findings, recommendations offer solutions to interpreting challenges for clinical situations. The study objectives are: (a) to understand the differences between healthcare providers’ and deaf patients’ perspectives toward VRI and in-person interpreting; (b) to emphasize the importance of providing healthcare providers with trainings to improve the quality of VRI and interaction with deaf patients. To end, the study addresses the importance of advocating deaf patients to ensure healthcare communication access.

291. Yoshioka, Natalie; Cotanche, Douglas; Doubleday, Alison; Lebowicz, Leah and Daugherty, John

**Temporal Visualization of Body Cavity Partitioning: An Interactive Timeline**

*Graduate / Professional - Biomedical and Health Information Sciences*

Embryology is essential for future health care providers to understand due to clinical significance, since birth defects and prematurity are leading causes of disability and infant
mortality. The lack of embryology visualizations presents a barrier to discovering embryonic relationships quickly and efficiently. A web-based, interactive timeline on body cavity partitioning was developed to allow users to discover key developmental landmarks of both normal and abnormal embryonic development. Body cavity partitioning was chosen as the area of focus, as organ system development is directly related to the embryonic spaces. Users can select events, which highlights related structures and defects with visual cues. It was anticipated that users would be able to find information about body cavity partitioning and embryonic defects more quickly and efficiently with the interactive resource versus a typical static resource containing just the content and images, in addition to gaining embryology knowledge. Thirty-four subjects participated in the study; 11 dental students, and 23 biomedical visualization students. Subjects’ post-test scores increased with both resources; however, only two of the six distributed tasks were completed more efficiently using the interactive resource. This resource has the potential to be improved and expanded to include other body systems in human embryology to provide a reference for students studying human embryology.

292. Yu, Michael and Afelik, Solomon

The Effect of INHBA signaling on Beta Cell Fate

Undergraduate - Honors College

Beta cells, housed in pancreatic islets, are unique endocrine cells that produce, store and release the hormone insulin in order to regulate blood glucose. Alpha cells, also found in the pancreatic islets, are endocrine cells that produce and store the hormone glucagon. This experiment studies the effect of Inhibin beta A (INHBA) overexpression on beta cells in rodent pancreas. INHBA homodimers form ActivinA, which has been shown to promote early pancreas development in rodents and is required for the directed differentiation of human pluripotent stem cells into insulin producing beta-cells. We found that, mice with beta-cell specific INHBA overexpression exhibited diabetic symptoms. Control and INHBA transgenic mice were sacrificed to extract their pancreas to create tissue slides for staining. Immunostaining and fluorescence microscopy were used to characterize control and INHBA pancreatic islets. Pancreatic islets from mice with overexpression of INHBA appeared to have increased numbers of alpha (glucagon producing) cells at the expense of beta (insulin producing) cells. What’s more, the overexpression of INHBA resulted in change in the pattern arrangement of glucagon to appear similarly as insulin. These observations led to the notion that INHBA signaling perhaps instigated the lineage reprogramming of beta cells to alpha cells. I hypothesized that overexpression of INHBA causes pancreatic beta to alpha cell fate lineage programming leading to diabetes. In order to test this hypothesis, I performed a detailed characterization of beta cell loss due to inhibin expression. In addition to phenotype qualification, tissue samples were statistically quantified using cell counting methods. This confirmed that indeed INHBA overexpression caused an increased in alpha cells at the expense of beta cells.
293. **Yusuf, Fatima**

**Impact of Parental Incarceration on Youth**

*Undergraduate - Criminology, Law, and Justice*

As the United States prison populations increases, many are questioning the effects that parental incarceration has on adolescents. Parental incarceration is not a single event; it is a dynamic process experienced by today’s youth population. Positive, nurturing relationships between parents and their children are necessary when growing up, yet these relationships are disrupted by the process of incarceration. Studies of children with incarcerated parents suggest that these children have increased risks of various negative life experiences, such as exposure to violence. Programs such as Safe From The Start work to identify young children exposed to domestic or community violence, and provide them with treatment services. Children and their caregivers receive an average of 9.3 sessions of service including counseling, family support, or other therapeutic interventions. Children range in age from 0 to 18, with an average age of 4.6. In our sample of 4,910 children who were referred for Safe From the Start services, 3,101 of those children had at least one parent who had ever experienced incarceration. Of the total sample population, 18% had a mother in jail, while 55% had a father in jail. This study analyzes the differences in violence exposure, presenting problems and risk factors of children with and without an incarcerated parent. The effects of parental incarceration on children’s emotional and behavioral health are also considered. Chi-square tests were conducted to study the relationships between parental incarceration and the variables above. Children with incarcerated parents are more likely to witness domestic violence and be victims of sexual abuse themselves. As for mental health, the severity of emotional and behavioral problems experienced in this juvenile population are at a heightened rate. Findings suggest that parental incarceration is associated with children’s exposure to violence and negative life experiences.

294. **Zafer, Salmaan; Gangemi, Antonio; Bhalla, Eesha; Raskind, Aleksander and Siddique, Adil**

**Metabolic Score as a Tool for Evaluating the Candidacy of Patients for Bariatric Surgery**

*Undergraduate - Minimally Invasive and Robotic Surgery*

Bariatric Surgery (BS) procedures are prescribed to morbidly obese patients who are unresponsive to traditional diet and medication in an effort to reduce their weight. The current evaluation criteria for bariatric surgery candidates are narrow, outdated, and inhibit patients who need these procedures from qualifying for them. This presentation reports on an ongoing retrospective study being conducted to determine the effectiveness of a metabolic score in determining which patients are the best candidates for surgery. 654 patients who underwent various BS operations at University of Illinois hospital will have their metabolic metrics recorded and statistically analyzed. Anticipated results include the derivation and effectiveness of the metabolic score as well as an estimate of its utility in clinical settings. Findings from this study can be used in the future to develop a universal scoring system for the National Institute of Health so that it may modify and improve surgery candidate selection policies.
295. **Zarate, Estefania**

**Purification of NPC1 Protein in Mammalian Cells for Binding Studies**

*Undergraduate - Engineering*

Niemann-Pick Disease, type C1 (NPC1) is a genetic, fatal, neurodegenerative disorder that results in accumulation of lipids in lysosomes. Mutations in the NPC1 gene results in disrupted lipid transport which contributes to the accumulation of lipid products. The NPC1 protein action mechanism is unknown. In this study, mammalian cells were used to optimize methods for transfecting cells with the NPC1 gene. Using transfection, resulting in overexpression of the NPC1 protein Western blot techniques were used to confirm the presence of NPC1 protein in transfected cells and the protein was purified by affinity chromatography. The purified protein protocol is currently being scaled and the resulting product will be tested to understand binding partners.

296. **Zhang, David**

**Identification and Analysis of the KDM5A Short Isoform**

*Undergraduate - Biochemistry and Molecular Genetics*

Lysine-specific demethylase 5A (KDM5A) is a protein that has been shown to interact with cancer-related proteins such as the retinoblastoma tumor suppressor protein pRB, inhibiting cell differentiation and promoting cell cycle progression. KDM5A has been found to have two isoforms, a longer wild type isoform and a short isoform, which has not been extensively studied. In this study, recombination was used to produce a new lentiviral plasmid containing the short isoform sequence with a FLAG epitope tag, which was confirmed through restriction digestion and then used to transfct 293T cells and overexpress the short isoform. A newly generated KDM5A short isoform-specific antibody YZ6264 was validated through immunoprecipitation and Western blotting of these cell lysates. In addition, general KDM5A antibodies and FLAG antibodies were used to further confirm the presence of the protein of interest. Comparison of transfected and non-transfected cells indicated that YZ6264 can be used to isolate and identify the short isoform when overexpressed. In addition, PC9 cells were transduced with lentiviruses containing the KDM5A short isoform plasmid and FUCCI, a cell cycle fluorescent indicator, to examine the effects of KDM5A short isoform overexpression. Cells were also treated with DMSO and erlotinib to examine effects on drug resistance. Results showed that overexpression of the short isoform resulted in a significant decrease in cell viability across all treatment conditions, but no difference in drug resistance to erlotinib was observed.
297. Zilinskas, Alex and Demissie, Robel

**Molecular Dynamics Simulation Study of Mutation-Induced Conformational Changes in FabI**

*Undergraduate - Chemistry*

Staphylococcus aureus (S. aureus) is an infectious agent that has gained medical, and media, attention due to the rise of antibiotic-resistant strains, such as methicillin-resistant Staphylococcus aureus (MRSA). Antibiotics assert their action by binding to a specific enzyme essential to S. aureus, but not to that of humans, to inhibit the production of essential metabolite(s) needed for S. aureus growth. The resistance is often due to mutations in these essential enzymes to overcome the action of the antibiotics. Triclosan is such an antibiotic used to treat S. aureus infections by binding to the essential FabI enzyme in S. aureus. Triclosan-resistant strains usually contain mutations at crucial sites (active site or subunit interface sites) that reduce triclosan binding affinity toward FabI. However, mutations at non-crucial sites may also lead to triclosan resistant FabI. This study involves using molecular dynamic simulation methods to investigate conformational changes in mutant FabI enzymes with non-crucial site mutations that result in triclosan resistance. Amber14 software was used to generate atomic conformation of these FabI mutants, and the structural data were analyzed using the Chimera software. Equilibrium root mean square deviations (RMSD) of the structures of mutants from that of the wild type were obtained and show that mutations at non-crucial sites may also induce conformational change to inhibit the binding of triclosan to FabI, and thus these mutations may also lead to triclosan-resistant S. aureus strain.

298. Zimmer, Hannah and Horswill, Craig

**Effects of an Alternative Standing Workstation on Energy Expenditure**

*Undergraduate - Kinesiology and Nutrition*

Background: Sedentary lifestyle is strongly linked to the development of cardiovascular disease and Type 2 diabetes. The work environment contributes greatly to being sedentary, as people spend significant time at desks and on computers. Objective: The purpose of this study was to obtain pilot data in comparing energy expenditure for two different workstation conditions while performing cognitive tasks. The conditions included a standing desk station and a standing desk with single leg swing (Hovr®) device that was developed to promote physical movement and help combat aspects of sedentary life. Methods: Three males and two females (age: 21.4±0.55) were tested for metabolic rate across both conditions. Respiratory gases for VO2 and VCO2 (L/min) were measured continuously during each subject’s 20-minute trial. Each trial was split in half, with the conditions performed in randomized order for 10 minutes each. The data were expressed and analyzed as oxygen consumption (VO2, L/min), METS (metabolic equivalents to resting rate), and energy expenditure (kcal/min). Mean and standard deviation are used to summarize the data. Statistical analysis of the data was done using a paired T-test (p<0.05). The
effect size was also calculated for VO2. Results: A tendency for difference was observed in VO2 from the standing workstation to standing Hovr® workstation (0.33±0.08 L/min vs. 0.37±0.07 L/min, p<0.06). The effect size was 0.42. There was a significant difference between the standing workstation and the standing Hovr® workstation in METS (1.21±0.30 vs. 1.32±0.21, respectively; p=0.04). Conclusion: Use of the standing Hovr® workstation raised energy expenditure by 9.2% compared to a standing workstation. The Hovr® device promotes spontaneous lower limb movement, and it might be a beneficial tool for decreasing total seated time and further elevating NEAT at standing desks in the workplace.

299. Zoeckler, Veronica; Brennan, Kevin; Young, Christine; Bucher, Karen and Hampton-Marcell, Jarrad

**Exploring Animation Styles to Communicate the Effects of Exercise on the Gut Microbiome**

*Graduate / Professional - Biomedical Visualization*

Visual explanations of human microbiome findings are needed and continue to grow as research continues. This study provided a visual explanation for a topic in microbiome research in the form of an animation. Studies have examined whether animations are effective teaching tools, finding that viewers can be distracted by excessive detail in some cases. Other have observed viewer preferences for the amount of detail included in visual representations. This study tested educational outcomes of animations with different levels of detail and investigated visual preferences among the viewers. It utilized the visual component of realism, referred to as level of detail, to define different styles of animation. An animation was rendered into three versions each with a distinct visual style: realistic, semi-realistic, and schematic. These animations were shown to undergraduates studying microbiology and exercise science to study educational outcomes and viewer response to visual styles in scientific animation. This research offers data on the educational benefits of animation with respect to style of visual representation, adding to a limited amount of literature. There is debate over the effectiveness of scientific animations, with level of visual detail being a commonly identified issue. These findings are important because they contribution to the understanding of audience style preferences and the effectiveness of various levels of visual detail in scientific animation.

300. Zuchowska, Paulina; Ilievski, Vladimir; Le, Khuong; Toth, Peter T.; Green, Stefan J; Ragozzino, Michael E. and Watanabe, Keiko

**Effect of periodontal pathogen Porphyromonas gingivalis on neurodegeneration.**

*Undergraduate - Biochemistry*

Hypothesis: We hypothesize that chronic oral application of a periodontal pathogen results in translocation of pathogen/products to the brain and results in neurodegeneration. Objective: To test if orally applied periodontal pathogen Porphyromonas gingivalis (Pg) is detected in the
brains of experimental animals with periodontal pathogen administration and results in neurodegeneration. Methods: Pg or vehicle alone (experimental and control respectively) was orally applied to C57BL/6 wild type mice every other day for 22 weeks (N=10 per group). Brain tissues were collected at sacrifice, fixed in formalin and paraffin embedded sections were made. Immunofluorescence microscopy was used to determine the presence of Pg/gingipain and neurodegeneration in CA1 and DG regions of the hippocampus. DNA and RNA were extracted from sections using Maxwell® RSC DNA and RNA kits and qPCR and RT-PCR were performed respectively to determine the presence of Pg/gingipain and expression of NeuN (rbFOX3). Results: Experimental group exhibited the presence of Pg/gingipain in the hippocampus by immunohistochemistry and qPCR confirming the translocation of orally applied Pg to the brain. Neurodegeneration was evident in the experimental group (p<0.0001) by both immunofluorescence microscopy for NeuN, FJC analysis, and RT-PCR for rbFOX3. Conclusions: Our results suggest that repeated oral application of Pg results in the translocation of periodontal pathogen and neurodegeneration. Funding: NIH R01DE021405 IRB/ACC protocol: 15-142
Impact Day

Poster/Oral/Oral Creative Presentations
301. Abdulbaseer, Ummesalmah

The Patient’s World in Critical Care: People, Spaces, and Processes of Family’s Interactions

Undergraduate – Psychology

Presentation Type – Poster/Impact on Community/Research

Much literature has explored the complexity of healthcare environments with a focus on clinician performance. However, limited examination exists of this complexity with the consideration of the patient and family role. Based on 50 hours of observations on a Medical Intensive Care Unit, we describe the roles, physical spaces, and processes associated with critical care with a focus on the patient and family’s interactions with clinicians and staff. Given that often in critical care environments, patients are incapacitated and cannot play an active role in their care, communication and decision making responsibilities shift onto their family members. Thus, if engaged, families must navigate a complex environments of multiple roles of providers to both receive and deliver information, along with making decisions regarding patient care. In addition to representing environmental complexity around the patient, we present potential challenges and begin to think about implications.

302. Abraham, Abraham

Analysis of the Optimal Method of Protein Identification through Liquid Chromatography and Mass Spectrometry

Undergraduate - Chemistry

Presentation Type - Poster/Impact on Community/Research

Niemann-Pick disease Type C is a lysosomal storage disease that affects metabolism and are caused by genetic mutations either in the NPC1 and NPC2 genes. These mutations may lead a deficiency in the protein products of NPC1 and NPC2, which normally aid in the movement of cholesterol and other lipids with to a build within cells and organelles. Loss of these protein products would cause an inability of the cells to transport cholesterol and other fatty lipids inside the cell. The disease mainly occurs in children, is sometimes fatal, and there is no known cure. As the disease, may be caused by a shortage of protein products from NPC1, NPC2, and other genes that might interact with these genes, it is important to have an identifying the majority of proteins within a cell for further study of the disease. Three different methods of preparing a protein sample will be tested to see which method yields a higher quantity of proteins identified through liquid chromatography and mass spectrometry. In the first method, an intact protein sample is separated into fractions via liquid chromatography before being cut into
peptides by trypsin digestion for analysis by mass spectrometry. In the second method, a protein sample is cut into smaller peptides through trypsin digestion before being separated into fractions by liquid chromatography and analyzed by mass spectrometry. In the third method, the protein sample is cut into peptides via trypsin digestion but not fractionated by liquid chromatography before being analyzed by mass spectrometry.

303. Brzoza, Izabella

Review of the Evidence-Based Best Measures of ADHD for Girls

Grad/Professional – Psychology

Presentation Type – Poster/Impact on Career Development/Research

ADHD is a neurological developmental disorder characterized by inattention, hyperactivity and impulsivity. Boys and girls differ in terms of diagnoses and display of symptoms. This difference often results in misdiagnoses. For girls, they are more likely to be misdiagnosed and thus have complications as a result. There has been a lot of research done on young boys that have ADHD. Young girls on the other hand have not been included in much research until recent years. This has resulted in an under-representation of girls with ADHD in not only work but in measures. The best measures of ADHD include self-reports, behavioral measures and classroom observations. The presentation will present the best measures of childhood ADHD for both genders. In the end, common issues will be addressed and recommendations for how best to assess ADHD in girls will be presented.

304. Chatterjee, Rukmava

Extreme Icephobicity of Passive De-Icing Materials

Grad/Professional – Mechanical and Industrial Engineering

Presentation Type – Creative Presentation/Impact on Community/Research

Hesitant at first, hastening post, quiescent for the most, falling snowflakes are infinitely many yet en masse one; a visual treat to cherish. Ironically, the menace of ice-frost formation on functional surfaces is ubiquitous in our daily life, having a deleterious effect on the safety and effective performance of transportation, power generation and transmission, thermal management and telecommunication industries entailing yearly economic damage of billions of dollars worldwide. Over the years, despite remarkable progress in the fields of microfabrication and surface chemistry, majority of the engineered surfaces have been futile in passively curbing icing under extreme environs of freezing temperatures and high humidity; with the modern industry still relying heavily
on active mechanical, chemical and electro-thermal de-icing techniques which are often energy and cost intensive. Motivated by this and conducting research on material characterization, interfacial thermofluidics and surface engineering, we have developed a novel class of durable passive icephobic materials. Having tested these materials in their pure form in a controlled humidity glovebox with 80 percent relative humidity (RH) and freezing temperature of -15°C, significantly delayed ice formation was demonstrated as compared to conventional superhydrophobic surfaces; with some of the materials exhibiting sustained ice free operation for more than 91 hours. Subsequently, the role of the substrate material’s nature, surface topography (roughness), crystalline structure, dependence on environmental conditions which dictate the icing physics have been studied in detail. Additionally, the materials on being infused into micro textured hydrophilic surfaces and tested in a humid atmosphere of 60 percent RH and temperatures of -7°C, were shown to outperform the control superhydrophobic surfaces by 2-4 times and Slippery Liquid-Infused Porous Surfaces by 3-6 times in terms of icing delay. The encouraging ice mitigation results of these novel materials have the potential for the design and fabrication of durable industrial anti-icing coatings.

305. Dairi, Layal

**The Broken Mosaic: In Honor of the Syrian Revolution**

*Undergraduate - Music Department*

**Presentation Type** - Creative Presentation/Impact on Community/Global Perspective & Diversity

People throughout history have used music as a form of expression. Through music, human thoughts, feelings, and experiences can be shared. By composing a musical piece for the piano, my music will echo the voices of the legendary Syrian people. On March 18th, 2011, the peaceful demonstrations in the city of Daraa forever broke the barrier of fear.

My inspiration stemmed from the Syrian Revolution. I wrote my composition in honor of the Syrian people and their desire for freedom and dignity from an oppressive and corrupt regime. Malek Jandali, a Syrian-American composer, is a passionate activist who supports the Syrian revolution. In 2015, Jandali started a nonprofit organization called Pianos for Peace. Here, Jandali wishes to transform culture by building peace through music and education. As a Syrian-American myself, I would like to voice my support through music for the rights of the Syrian people to live forever free and proud.

This composition will include six key elements of music: rhythm, melody, harmony, timbre, form, and dynamics. The title of my piece is “The Broken Mosaic: In Honor of the Syrian Revolution.” Mosaic is traditional, Syrian hand-made art. Small, flat pieces of pearl shells are inlayed into rare wood to make unique pieces of antiquities. Once broken, mosaic is difficult to put back together. From my artistic point of view, the inlayed pieces represent the cultural mosaic of the Syrian people. Since the revolution, the Syrian
mosaic has been broken and shattered under the hands of the ruthless Assad regime. “The Broken Mosaic” is gifted to the heroic Syrians who sacrificed for the cause of the revolution.

306. Dasgupta, Swikriti

The Impact of Sugar Level in Diabetic Patients on Dental Implants Prognosis

Undergraduate – Dentistry

Presentation Type – Poster/Impact on Community/Research

The idea was to see the correlation of the sugar level in a diabetic patient and how it affects dental corrosion and compare past and present research/literature review on it. Diabetes is a disorder where the glucose level is higher than what would be considered average (Diabetes.org). Additionally, diabetes tends to have an effect on teeth especially due to high glucose level in the body. The scope of this study is immense as it will help us understand the correlation between diabetes and tooth problems in depth and this is an extremely pressing issue in the current generation. Diabetes can mainly inherited due to the surrounding environment and the food that was consumed. According to the primary sources acquired from Pubmed, it was found that dental implants are only successful if the patient has good control of the sugar level (PubMed). Thus, similarly, my hypothesis for the study, in the process of being conducted, is that as the glucose level in the body increases, the corrosion increase because teeth become weaker with age. The research will be laid out as follows. The glucose level will be the independent variable and the corrosion parameters will be the dependent variable. There will be five different variations: A variation of the normal patient is 120-140 mg/dc, mild diabetic will be 140-179 mg/dc and severe would be 180-200 mg/dc. A tooth of a subject, who is 60, will be soaked with the glucose level variations for each trial and this will show if the corrosion is increases with a higher glucose level. Later, tooth samples from younger subject groups to do a further comparison and also to compare with the aforementioned Pubmed results.

307. Erickson, Laura

Earthenware Designs and Slave Women in the Philippines

Undergraduate - Anthropology

Presentation Type - Poster/Impact on Community/Research

Throughout history, Chinese and Spanish texts have reported raiding, trading, and the capturing of slaves within the Philippines. Many of these slaves were women – a group of people who have largely been ignored by anthropologists in prior decades, therefore
skewing the way we may perceive a culture and its history. This research project aims to examine how women, who were the main potters of the pre-colonial Philippines, may have brought certain pottery designs with them from small polities to the large, powerful polities they were forcefully made to live in. To accomplish this, we examined pre-Spanish period pottery pieces from the Tanjay area of Negros and looked for design patterns that may be similar to those of other polities in the Philippines. We also looked through other published archaeological articles for pottery pieces excavated in multiple polities throughout the Philippines, including Manila, Cebu, Fuga Moro, Southeastern Mindanao, Sulu, Masbate, Panay, and Palawan. While grouping similar designs together into a category, it was found that some polities had pottery designs similar to the designs of larger polities such as Cebu or Manila, while polities such as Sulu or Southeastern Mindanao had pottery designs that were isolated to only those single polities. This indicates that perhaps the designs from smaller polities may have moved into larger polities along with the movement of women, while larger polities such as Sulu, which did not have as much women being captured, had designs that were not as commonly being moved into the smaller polities. Though there is not enough evidence to fully support this hypothesis, this research project can provide implications about the contribution of women to a culture. This can be further researched in the Philippines, or even more broadly, Southeast Asia, to create a bigger picture of Southeast Asian cultures.

308. Evans, Brian

**Growth in Leadership, Service and Recognition**

*Undergraduate - Residence Hall Association*

**Presentation Type** - Oral Presentation/Impact on Self/Leadership & Involvement

I have spent the last school year as an executive board member for the position of Recognition for the National Residence Hall Honorary. The experience through this has gotten me more involved as a leader on campus on top of the previous experiences I had within Campus Housing. From going into this position I have seen how important recognition is, and how it impacts individuals as I give people Of The Month awards for their actions each months, to which I have read amazing things people have done and learned how important it is to recognize people. Along with that I have began volunteering this year and seen how a little work in a day can affect a community. Taking residents to these events has made an impact of how I want to continue working with communities. Along with that I have grown in leadership as I went to my first leadership conference this year at the Illinois Residence Hall Association Conference, to where I attended various programs that taught me new ways to lead whether it is, on creating programs for others to learn about cultural competency or finding new teambuilding skills in the programs. These experiences have helped me grow as a person, and helped me become a better leader for my community.
2D Materials for Long Life Li Metal Batteries

Grad/Professional – Mechanical Engineering

Presentation Type – Poster/Impact on Career Development /Career Development

Lithium (Li) metal is holy grail of anode materials in lithium ion batteries due to its large theoretical capacity (3860 mAh/g) and low redox potential (−3.04V vs standard hydrogen potential, H2/H+). Nevertheless, considering the hostless nature of Li metal, Li dendrite formation limits its practical application. Therefore, inhibiting the uncontrolled growth of Li dendrites during the Li plating process is essential before commercialization of Li-metal batteries. Inhomogeneous surface charge distribution and also instability of the solid electrolyte interface (SEI) cause uneven Li ion deposition and Li dendrite formation. In this study, we have employed graphene oxide nanosheets (GOn) for suppression of Li dendrites. This system is based on a synergistic effect. GO is a strong material with electronically insulating nature, which can prevent short circuit in the battery. Also the negative charge of GO coating can result in a more uniform negative charge distribution on the Li metal surface and as a result a more uniform Li deposition on the surface. Defective structure of graphene oxide and high interlayer spacing allows for facile Li ion diffusion through its layer. This thin coating has been applied on the surface of glass fiber separator to for a 3D coating, which can effectively control the morphology of the deposited lithium. Our electrochemical tests and microscopy imaging results show the highly packed Li deposition underneath the coating and different simulation techniques confirm the effectiveness of our approach and suggests the mechanism for this uniform and dendrite-free lithium deposition.

Effect of Single Task and Dual Task on Gait in Individuals with Mild Cognitive Impairment and Healthy Adults

Grad/Professional – Rehabilitation Sciences

Presentation Type – Poster/Impact on Community/Research

Older adults with mild cognitive impairment (MCI) have problems with memory and task execution. Individuals with MCI demonstrate gait impairment resulting in increased risk of falls and institutionalization, which is an early motor sign. A dual-task (DT) paradigm might help to improve the evaluation, screening and guide future intervention. Eight individuals with MCI and seven age-matched healthy older adults walked on the GAITRite walkway under 3 different conditions. First, participants walked over the
length of the mat as they usually do without a secondary task (single task, ST). Then they walked carrying a glass of water in their dominant hand (manual task, MT). Lastly, they walked while reciting alphabet skipping 2 letters and counting the next one (cognitive task, CT). Gait velocity, cadence, step length, stride length and stance phase were calculated. Individuals with MCI as compared with the healthy older adults walked with significantly slower gait velocity, smaller cadence (p<.001). Our results suggest that the use of a DT paradigm with cognitive secondary task could be an important marker for early detection of MCI.

311. Gupta, Rajas

**UIC: University of Invigorating Change**

_Undergraduate – Center for Student Involvement_

**Presentation Type** – Oral Presentation/Impact on Self/Career Development

The presentation captures the key elements of my involvement on campus with various student organizations and the center for student involvement and how they’ve molded me into the person I am today. The true impact can only be felt by me and those who’ve experienced me develop but through this presentation I hope to share my story and pay a tribute to all those I’ve met over the past four years.

312. Harris, Diamond

**Emotional Competence in Child-Made Storybooks**

_Undergraduate – Psychology_

**Presentation Type** – Oral Presentation/Impact on Community/Research

My internship takes place at The YMCA at Metro Chicago (The Y), which is a research and demonstration center. During the semester of Fall 2017, my duties included interacting with and observing preschoolers in a variety of classroom settings, as well as coding qualitative data, such as videos and child-made storybooks. Following the Fall 2017 semester, I was invited to continue my internship into the Spring 2018 semester in the Early Learning Demonstration Center (ELDC). This semester, my duties include interacting with children between the ages of 6 weeks and 3 years in a classroom setting, assisting in basic care needs (feeding, diaper and clothing changes, etc.), reading to them, and supervising and leading play and peer interactions. My work at The Y has had an extremely positive impact on the children. The age group with which I work is one in which a lot of developmental milestones occur. My roles as a volunteer at The Y help to promote skills such as language development, color and number recognition, and social-emotional development. In addition to my work in the ELDC, I also conducted a small
research project to study emotional competence in young children’s writing. I used closed coding to analyze child-made storybooks to see what aspects of emotional competence were displayed the most often in children’s writing and illustrations.

313. Hathaway Miranda, Heather A.

**Cuentos de la Maestra/Teacher Tales of a Bicultural Latina Feminista in an all African American, all-male Chicago High School**

*Grad/Professional – Educational Policy Studies*

**Presentation Type** – Oral Presentation/Impact on Community/Global Perspective & Diversity

The purpose of this personal narrative paper is to examine the classroom experiences of a bicultural Latina high school Spanish teacher in an all African American, all-male school in Chicago. Unpacking the complexities of race, ethnicity, class, sexuality, and gender is one of the goals of the paper as well as to open dialogue about how these intersections are interwoven with a commitment to feminism in the classroom in an all-male school. This paper has several aims including the following: 1) challenges faced across gender lines when teaching in a majority male environment and all male school as a Latina female and vocal feminist, and 2) exposure of the audience to triumphs and mistakes when weaving lessons of race/ethnicity, gender, class & sexuality in Latin America and the U.S. through formal Spanish language instruction. Suggestions for curriculum in the Spanish classroom when teaching cross-culturally and across gender lines will be included.

314. Hernandez, Jose

**Sustainable Education a Culturally Specific Approach – Office of Sustainability Internship Program**

*Undergraduate – Sustainability Internship*

**Presentation Type** – Poster/Impact on Community/Environmental Awareness & Sustainability

The Office of Sustainability (OS) works to maintain and advance the UIC’s sustainable goals through data tracking, progress assessment, programmatic planning, and information circulation. Sustainability is often seen as a global issue, something that is too daunting for the average person. However, as Sustainability Interns our goal is to bring sustainability into perspective and present it to communities in an easily consumable package. The Sustainability Internship Program (SIP) allows for real world experience with community and campus organizations, as well as training form professionals in the field of sustainability. Through an ISEIF grant, the OS and SIP have partnered with Elevate Energy to engage the UIC community on ComEd’s Smart Grid.
Working with UIC students and staff, SIP Interns look to further develop campus awareness and knowledge around sustainability and smart grid. Working on campus and off campus, the interns used smart grid as a platform for education and developed different methods such as dialogue & conversation and, tabling & educational games. Interns used these methods of sustainable education through efforts like community gardens/green spaces and UIC student events to continue the education of faculty, staff, students, and community members.

315. Hussaini, Qaswa; Galvan, Amairani; Rinehart, Sydney and Shah, Reshma

**Parent-Directed Interventions Promoting Parenting Behavior for Healthy Child Development**

*Undergraduate - Psychology*

**Presentation Type** - Oral Presentation/Impact on Community/Global Perspective & Diversity

A significant amount of research highlights the gap in child development in low SES regions (South Asia, East Asia, Sub-Saharan Africa, parts of Latin America, and the Caribbean) and higher SES regions (USA, Canada, Australia, Germany). Children in low- and middle-resource countries grapple with behavioral disorders and achievement of developmental milestones. Although extensive research conducted by international health organizations document the increasing negative effects of poor child development on a child’s life-course trajectory, not enough research provides tangible strategies to combat the current conditions for children living in low SES areas. Presently, research at the Department of Pediatrics at UIC is examining the effects of a parent-directed program, Sit Down and Play, designed to promote positive parenting behaviors that encourage healthy development for children, with an emphasis on supporting social-emotional and language development in young children (2 months – 2 years). Prior research demonstrates that cognitive stimulation in the form of talking with a young child, providing learning opportunities, and responding to a child are positively associated with higher cognitive development in young children. Although parent-directed interventions that address the key parenting behaviors do exist for implementation in low SES regions, these programs have run into complications related to high costs, lack of cultural transferability, and poor parental involvement. As research assistants for Sit Down and Play, we were able to gain insight into application based research with the program’s mission to support key parenting behaviors through the delivery of a brief program delivered at UIC’s Child & Youth Center, a hospital-based primary care office that serves a predominantly low-income, urban population.

316. Jagatramka, Ritesh and Habib, Mohammad

**Materials Used in Li-S Batteries**
Grad/Professional – Materials Engineering

**Presentation Type** – Creative Presentation/Impact on Community/Environmental Awareness & Sustainability

Need for batteries has increased drastically with advancements in battery and technology. Lithium based batteries have made significant advances in the field. Thus, to better understand the functionality and efficiency of Li-S batteries a study had been conducted for understanding the current advancement in the technology.

317. Jordan, Majestic; Alexander, Jacqueline; Howard, Kilenmarec; McCline, Kilah and Nwigwe, Lillian

**Woman 2 Woman Empowerment Initiative**

*Undergraduate – Woman 2 Woman*

**Presentation Type** – Oral Presentation/Impact on Self/ Leadership & Involvement

The presentation is based on what we truly believe is black women empowerment in action. This presentation is dedicated to the empowerment initiative, Woman 2 Woman (W2W). W2W is an initiative under the African American Academic Network (AAAN). The coordinator of the initiative is AAAN’s academic advisor, Ashely Y. Stone. Woman 2 Woman obtains several different components that are related to both Black Feminist Thought and womanism. With the framework being heavily rooted into the teachings of Alice Walker and her definition of womanism, W2W uses this to pave the way in which black women express themselves in their own light. Leadership, community, cultural immersion, mind/body/soul/art, and alumnae engagement are key components that not only enables the members to share a collective mindset and take reign on our individual experiences, but it also allows us to connect with other Black women who come from completely different walks of life. Being in this program, it helps us understand that life is so much more than the standards that society tries to feed us about ourselves. To be unapologetic and to stand in your own truth is the definition of what it means to be a black woman. With Woman 2 Woman, the main goal is to provide a sense of connectedness and belonging within both the members and with other black women on and off the UIC campus. We use this to come together to interact with fellow sisters, devoting ourselves to the community off and on campus, and being able to see our strengths as it promotes our leadership skills.

318. Kuzma, Anna

**Education of Cervical Radiculopathy for Young Adults**

*Undergraduate – Liberal Arts & Sciences*
**Presentation Type** - Creative Presentation/Impact on Career Development/Career Development

Art and design have an impactful presence on people and are a powerful tool when implemented in education. High school students respond positively to artistic visual tools alongside information being taught. To stimulate interest in kinesiological studies, I created and assembled information on a specific neurological condition, cervical radiculopathy (CR). Pairing information about CR along with interesting, anatomic visuals amongst a pleasant design can promote education in multiple ways. First, it can draw the audience’s attention, and help keep the reader interested. Also, the use of graphics can better illustrate an idea to a student, more clearly than a paragraph may be able to. A visually appealing presentation of information can make the reader feel more connected to the topic, drawing their interest in. Given this, the educator has the ability to engage students in gaining more in-depth information to further the students’ progress (and possibly aid them in the great search of “what-do-I-want-to-be-when-I-grow-up”). Using the educational tool with anatomic art that I created for young adults, I presented this information to high school students, with a positive response. Students interest in the medical field or the arts were discussed following the presentation.

319. Lay, Taylor

**Educational Aspirations of Urban Youth**

*Undergraduate – Psychology*

**Presentation Type** – Poster/Impact on Community/Research

Ongoing discourse surrounding urban youth and post-high school education is of much interest. Scholars have identified challenges that impede urban students' access to higher education (e.g., poor academic preparation, students' difficulties navigating the college enrollment process, and poor understanding of financial aid systems). Despite this fact, youth of color do have high educational aspirations as evidenced by findings from survey research. However, we know less about how urban youth discuss success post-high school and the steps they take to achieve their goals. Therefore, this mixed-methods study may help bridge understanding about discrepancies between youths' access and aspirations.

To address this gap, I pose the following research questions:
(1) What are the themes that emerge when low-income, racial/ethnic minority youth are asked to describe why learning is important to them?
(2) Do these themes vary by gender, race/ethnicity, and household income?

This study uses qualitative data from a sample of 216 predominantly racial/ethnic minority, low-income youth between the ages of 13 and 17 living in Chicago. Youth were
originally recruited into the study as part of a socioemotional intervention trial implemented in Chicago Head Start preschool programs between 2004 and 2006. In the most recent round of data collection (which took place in 2016), youth were asked an open-ended question, "Why is learning important to your goals?" This question was coded to explore patterns in the ways youth conceptualize learning and relate classroom-based learning to their future aspirations. An iterative, collaborative process was used to thematically code and analyze responses. Initial themes have emerged including: wanting to achieve financial success and desire to make a larger world difference. In a second set of analyses, we will consider whether response categories vary by participant demographics, specifically youth gender, race/ethnicity, and family income. Implications for intervention and future research suggestions will be shared.

320. Leon, Julian

**Vigilantism and Justice**

*Undergraduate - Criminology, Law & Justice*

**Presentation Type** - Poster/Impact on Community/Career Development

The idea of vigilantism has been around for centuries. Despite popular and official concern about the increase in vigilante activity around the world, there has been little serious attempts to conceptualize vigilantism. It is an idea that played a vital role in the formation of the United States during the American Revolution. It also serves as a crucial factor that influences relationships between society and law enforcement. This paper serves to define the term “vigilantism” and argue for its benefits on society. Motives, effects, and mechanisms of vigilantism will be discussed as well as the components that distinguish it as either justifiable or unjustifiable. Early 1800's to contemporary vigilantism case studies will be analyzed to compare their impacts on society. Finally, there will be a review of popular culture representations and political cultural representations of vigilantism to portray misconceptions represented through the media.

321. Lopez, Brianda

**All-inclusive Sex Education**

*Undergraduate – Applied Psychology*

**Presentation Type** – Oral Presentation/Impact on Self/Civic Engagement & Social Justice

Lesbian, gay, bisexual, transgender, queer and questioning (LGBTQ) youth communities have struggled to get equal representation throughout education spectrums. Many schools fail to implement school curriculum that recognizes the identities, experiences, and needs
of LGBTQ youth. The need for all-inclusive LGBTQ education can be seen more specifically in sex education programs. Sex education programs have revealed positive outcomes and proven to be a beneficial reliable source of information when well-designed and well-implemented. Results demonstrate a decrease in sexual risk behaviors and an increase in positive sexual health relationships and outcomes. For LGBTQ youth to obtain the same advantages these programs provide, sex education should be LGBTQ-inclusive. The purpose of this literature review is to focus on sex education programs that have recognized the need for LGBTQ-inclusiveness and proven to demonstrate their effectiveness. LGBTQ-inclusive sex education programs would not only help the youth understand sex through medical information but also in defining and understanding gender identity and sexual orientation. Inclusive programs embrace positive representations of LGBTQ individuals and their relationships with other individuals, families, and significant others. It challenges the common stereotypes within the LGBTQ community and focuses on the need these programs have to reduce sexually risk behavior for all individuals and their identities as a whole.

322. Lu, Tiffany

**Combining Three Jobs Into One**

*Undergraduate – Creative & Digital Services*

**Presentation Type** – Oral Presentation/Impact on Career Development /Career Development

When beginning my journey at UIC, I felt extremely lost. I didn’t know where anything was, how to get involved, or who to be friends with. The moment I moved into college, I knew my goal consisted of finding an internship or a job, joining a club, and impacting the community. However, my time is limited and prioritizing it would mean that I had to give up one activity for another. So, I started off small with a marketing internship, which allowed me to practice time management, and I also took part of Campus Housing’s Hall Council. I finished the year strong and hoped my experiences could assist me with future opportunities. I came back the following semester with a job on campus that involved marketing, joined the organization that brought back the school spirit, and was offered a position to work for Campus Housing. Now I can say that my experiences on campus this semester has not only impacted me, but also the community around me.

323. Majkut, Julia

**Resource Tool for ICAH**

*Undergraduate – Social Justice*

**Presentation Type** – Poster/Impact on Community/ Civic Engagement & Social Justice
I conducted research in association with the Illinois Caucus of Adolescent Health (ICAH), a network of empowered youth and adult accomplices who support the sexual health, rights and identities of youth through sex education, advocacy, and organizing. I am conducting research to discover safe and inclusive spaces for youth of all identities in the Chicagoland community. I am in charge of finding these spaces that can provide services such as STI testing, sexual violence support, counseling, education, jobs, housing, psychotherapy, abortion, abandonment, adoption, childcare, parenting skills, prenatal care, and other resources that the youth need. To create such a list, I analyzed data from the outdated resource tool that ICAH had provided youth several years ago, and I discovered that most locations discontinued their services. In order to find thriving local organizations, I began my research online with limited success, leading me to rely heavily on calling the location to gain more information. The data gathered from all these offices, clinics, and centers is compiled in such a way that is both informative and easy to use; therefore, ICAH can provide this pamphlet to youth in the community. This resource tool is vital since it offers access to additional services beyond what ICAH can provide. My resource tool provides information for youth of all identities so that they can navigate through life with the spaces and services they need in order to be comfortable, healthy, and safe.

324. Malone, Sarah; Cardiel, Micah and Gachugu, Njugu

**BDSM as a Tool for Sexual Assault Prevention**

*Grad/Professional – Criminology, Law & Justice*

**Presentation Type** – Poster/Impact on Community/Civic Engagement & Social Justice

Sexual assault occurs at an alarming rate of 321,000 victims per year in the United States. The prevalence of rape culture and rape myths have been established as principal causes of sexual assault, as well as lack of consent and clear communication in mainstream dating environments. Sexual health programs and depictions of sexual activity reinforce a heteronormative reality constrained by rigid rules of gender norms that are devoid of consent and lead to coercion or force. Most communication is nonverbal in social hook-up settings, where consent is implied and there is little to no discussion about sexual likes or dislikes. The goal of this work is to discuss specific forms of rape culture and poor communication that can be addressed from a BDSM perspective that provides alternative methods to engage in consent-oriented safe sex, and methods for survivors to heal from their assaults. The broad categories we have found in this study include Consent, Communication & Autonomy, Safety, Sex Positivity, Transcendence of Gender Norms, and Maintenance of Community Standards. While we believe that BDSM can offer many solutions to these mainstream issues, we also acknowledge that BDSM has its limitations. In any case, we believe this is a way to start the conversation and head in a safer direction. Using some of the foundational tenets of BDSM, we uncover ways to bring
positive change and conversation about sex positivity and consent to our social circles and larger audiences.

325. McKay, Tyler Eric

**UIC Black Tech Scholars Cohort 3**

*Undergraduate - UIC Black Tech Scholars*

**Presentation Type** - Oral Presentation/Impact on Career Development/ Career Development

This year's cohort of UIC Black Tech Scholars accomplished something very special in that through leadership and career development, restructured our own personal website and also worked with a client by the name of Smokin' Spokes to create a functional website for them. This was a wonderful opportunity for our young African American peers, and along with being partnered with AAAN, developed a unique and intense experience with HTML website development, resume development, and leadership opportunity.

326. Midgley, Siobhan

**A Thousand Words is Worth a Picture**

*Undergraduate – Art and Art History*

**Presentation Type** – Creative Presentation/Impact on Self/Global Perspective & Diversity

Everyone knows the phrase, “A picture is worth a thousand words”, but I say a thousand words is worth a picture. Photographs communicate emotions, drama, and curiosity, and they transport you to places you’ve never been before. As a photographer by hobby, I’ve come to deeply appreciate how photos convey meaning, but I’m also deeply affected by the meanings and nuances conveyed by the written word. Notice how the words I used to describe an intriguing photo (emotion, drama, and curiosity) are the same words I can use to describe an intriguing literary passage. Sometimes a picture can’t convey what words can, and for my capstone project, I’ve put that notion to the test. In the fall of 2017, I attended Université Sorbonne-Nouvelle in Paris as a foreign exchange student. My weekends were spent bus hopping across Europe and trying to capture the beauty of the world through shutter speeds, apertures, and f-stops. Now that I’m home, I’ve challenged myself to capture that same beauty but through the power of words. We often overlook the other senses when looking at photos, but I hope I can help you not just see the swan’s feathers but touch them and not just admire the blueness of the Mediterranean Sea, but feel its cold waters. Throughout the writing of my capstone project and through my work
at the Chicago Lighthouse for the blind and visually impaired, I’ve learned to more fully utilize the senses I so often overlooked. For those with vision impairments, I hope I’ve translated my visual observations into a language that will be meaningful to you. While I recognize that I may never completely understand what it’s like to be blind, I will continue to challenge how I view the world around me through the power of words and images.

327. Na'Allah, Saarah

Student Experience and Perceptions of the University of Illinois Counseling Center

Undergraduate - Psychology

Presentation Type - Poster/Impact on Community/ Civic Engagement & Social Justice

With the rising prevalence of mental health problems such as depression and anxiety in the past few decades, it is critical to examine access, barriers to treatment, and quality of care at mental health care facilities. Undergraduate students in particular, between the ages of 18 to 24 typically have a heightened onset of mental illness. For this reason, examining the college population is crucial for addressing public health concerns. Diagnosis and treatment are the first lines of defense when it comes to tackling mental health problems, however, if treatment is inaccessible, a barrier has put young students at the risk of suffering the adverse effects of untreated mental health ailments (Eisenberg, 2011). For this reason, this study aims to identify student experiences with the counseling center service provided at the University of Illinois at Chicago. The initial phase of this study involves an audio-recorded interview followed by a Qualtrics survey completed by current undergraduate students at the University of Illinois at Chicago (UIC). By acquiring student responses regarding their experiences at UIC, this study aims to use qualitative and quantitative data to present both student perceptions and experiences for quality improvement of mental health care facilities. The findings of this study indicate that most students who have used the UIC counseling center find the location, and amount of time between an intake appointment and treatment appointment serving as a barrier towards their treatment-seeking behaviors. The implications for this study indicate the importance of using longitudinal quality improvement strategies to monitor student experiences with mental health institution on their campus. This study also highlights the importance of taking into consideration the proximity of the mental health facilities to central student centers and matching to ratio of counselors to students in order to adequately serve the volume of student need.

328. Oliva, Nicholas

Impactful Experience at a Chicago Hospital

Undergraduate – Psychology
**Presentation Type** - Poster/Impact on Career Development /Career Development

The purpose of this poster is to discuss the impact that interning at a Chicago safety net hospital has had on my career development. The presentation begins with an explanation of what a safety net hospital is. It then moves to a more detailed discussion of my internship and specific skills I learned throughout my time at the hospital. Following this, I connect how the skills that I learned have impacted my future goals. Lastly, I will briefly share a small literature review that I completed as a way to give back to the hospital for everything that they have taught me.

329. **Pizzo, Bella**

*Untitled*

*Undergraduate – Gender and Women's Studies*

**Presentation Type** – Creative Presentation/Impact on Self/Civic Engagement & Social Justice

Around the year 2003, at 8 years old, I was raped by a friend's brother while sleeping over at her house. Although I did not remember this until late 2015, the experience haunted my every move, my every relationship, and my every interaction. Upon remembering the trauma, I entered into therapy, eventually participating in CBT, or cognitive behavioral training. I began exposure therapy, forcing myself to retell the story of my rape over and over again, and listening to the tapes every day, until the story became part of my lived reality and I was able to start to integrate it into my life. This painting is a product of the healing and painful work I am doing.

330. **Qureshi, Maha; Modi, Shivani; Rizvi, Zoha and Lu, Tiffany**

*Impact of NACA*

*Undergraduate – Student Activities Board*

**Presentation Type** - Oral Presentation/Impact on Self/Leadership & Involvement

The UIC Student Activities Board (SAB) is an organization devoted to enhancing the UIC student’s college experience. Our core mission is to plan interactive, entertaining, and educational events that bring the UIC community together to form long-lasting relationships, along with school spirit. SAB directly impacts the community as we connect students through engaging events. In order to expand our vision and improve our organization, we sent four students to attend the National Association for Campus Activities (NACA). NACA is a yearly convention that brings colleges and universities from across the US providing opportunities for leadership and programming. At the
convention, we were able to interact with other schools through various workshops and activities. Through these interactions, we were able to learn how to better our organization as a whole as well as gain new ideas for our events. This opportunity had a significant impact on our members, allowing us to grow as individuals by pushing us into situations where we were representing our school to hundreds of other students from various parts of the country. We were also provided with the opportunity to meet with multiple vendors, allowing us to improve our communication skills and build connections with potential employers. We have felt the impact of being an integral part of SAB through opportunities, like NACA, which allow us to enhance our skills and create lasting connections.

331. Rao, Asha and Coumbe-Lilley, John E.

**Comparative Analysis of Disability Language Across the U.S, India, and Spain**

*Undergraduate - Rehabilitation Sciences*

**Presentation Type** - Poster/Impact on Self/ Research

Humans use words to communicate ideas and feelings to others (Devlieger, 1999). Words can have certain connotations and connected images, influencing the way others think, which can spread throughout a population. The foundation of knowledge pertaining to disability language exists. Few researchers have explored how disability is addressed and why often negativity surrounds the concept. This study used qualitative comparative methods to compare disability language in the societies of India, Spain and the United States. In each culture, a variety of mediums including: biographies, autobiographies, documentaries, and personal narratives of professionals in rehabilitation fields, were analyzed to gain a basic background in the views of disability. The purposes of this study were to 1.) explore the use of disability language in society 2.) compare the differences of disability language used in different parts of the world to show how populations communicate about disability 3.) Explain why disability is perceived negatively and the influence of negative perception on language use 4.) to recognize the significance of disability language. Emergent themes included: limitation, labeling, negative language use, and culture. A call to action for language change and an emphasis for implementation of positive disability language were present based on findings of the study.

332. Robinson, Paulette

**The College Experience of a First Generation Woman**

*Undergraduate - Center for Student Involvement*

**Presentation Type** - Oral Presentation/Impact on Self/Leadership & Involvement
My presentation will be a holistic dialogue about my various experiences of my collegiate experience at the University of Illinois at Chicago. I will discuss my involvement through departments and initiatives here at the university. I will also touch upon external factors that have contributed to my overall college experience. The growth that I have received throughout all of my opportunities has shaped me into the person I am and will help me become even better once I leave here.

333. Salami, Deborah; Waller, Jacob; Bailey, Deja; Rosenbery, Alexis; Patel, Bhavin; Griffin, Khaleah and Ogunbowale, Abimbola

Residence Hall Association Impacting Lives

Undergraduate - Residence Hall Association

Presentation Type - Oral Presentation/Impact on Community/Leadership & Involvement

The UIC’s Residence Hall Association (RHA) is a student leadership and involvement organization serving residents living in Campus Housing. RHA's mission is to help build a better community by enhancing the lives of residents in all residence halls by organizing programs, special events, and leadership opportunities for students. Some of the programs organized by RHA where residence come together and interact are Sex in the Dark, Battle of the Residence Halls, Six Flags Fright Fest, Fall Ball, RHA Basketball Night, Ski trip, and trips to Broadway in Chicago shows. Also, every semester, RHA takes at least seven residents to attend conferences for free to join students from all around the world to come together and learn to build their leadership skills in becoming future leaders in their communities. RHA is represented by seven executive board members who foster as liaisons for residents and Hall Council members as an active voice in Campus Housing. RHA educates residents on how to communicate, plan events, organize programs, time management, take on leadership positions, and all other campus housing related events within the community. RHA encourages residents to be future leaders in the community by becoming part of Hall Council, or committee members to help plan programs. The skills acquired in serving on RHA can be helpful in pursuing career goals. RHA rings true in the heart of UIC Campus Housing and the great services we provide have been very impactful.

334. Sawant, Shraddhali

Effect of Low Carbohydrate Versus Low Fat Dietary Treatment on Bone Health in Obese Adults

Grad/Professional - Physical Therapy

Presentation Type - Poster/Impact on Community/ Research
Dietary patterns including low-carbohydrate (LC) or low-fat (LF) types, have emerged as popular methods for inducing weight loss and/or promoting weight maintenance in obese individuals. However, a common concern among these diets is their potentially deleterious effects on bone health and osteoporosis risk. The purpose of this study was to determine whether low fat (LF) or low carbohydrates (LC) diet intervention for 6 weeks affects bone turnover in obese adults.

335. Siddiqui, Mariam; Burgos, Mae Ysabelle; Collins, James; Nandini, Deb and Herrera, Yadira

Assessing Single Payer Knowledge Among Undergraduate Students In an Urban University

Undergraduate – Public Health

Presentation Type – Poster/Impact on Community/ Research

Background: This research project addresses the complications that result from the myriad of health insurance plans in the United States as well as Physicians for a National Health Program’s support of a transition to single-payer health care in the U.S. Purpose: The project aims to produce three types of results: (1) Increase in knowledge of and familiarity with single payer health care among college students; (2) Identify the aspects of single payer health care most beneficial to college students; (3) Generate population interest data for PNHP. Methods: We used a convenience sample of approximately 60 undergraduate students from various classes at a university in an urban setting. The first phase of the project involved designing an infographic. To test the effectiveness of the material, a preliminary survey was created, with questions referencing the content in the infographic. The survey also asked questions gauging the population’s baseline knowledge of single payer healthcare. During the second phase of the project, a preliminary survey and infographic were disseminated to the participants. After completing the initial survey, participants were given a physical copy of the infographic. In the third phase, a post survey was administered 1-2 days after exposure to the infographic. Upon feedback, the initial infographic was updated to better address the population’s concerns and interests. Outcome: After being exposed to the infographic, students were more knowledgeable about the characteristics of single payer, and therefore more comfortable explaining single payer to a peer. The aspect that appealed to students the most was access for everyone and lifetime coverage. Furthermore, the infographic was altered based on the new population information for PNHP.

336. Suden, Andriy

uDay
Humans, as individuals, love to set goals and go out to achieve them. However, most individuals don't bother tracking their progress, nor putting down their goals on paper. uDay is a mobile application designed to assist people in just that - it allows it's users to write entries about their days, set goals that they would like to accomplish, and track the progress of those goals by receiving reminders when they are near a certain location or deadline. With simplicity and ease-of-use in mind, uDay was designed to contain a beautiful, yet simple design that is very intuitive to the average smartphone user. With a built-in map, users can tag their entries with geographical locations to receive reminders when they nearby, and see a visual of the places they've been and want to go. A colorful timeline shows the history of a user's entries, and allows them to visualize their progress. The ability to add photos and videos to their entries adds a personal touch, and incentivizes a user to come back. With over 7 billion people in the world, uDay makes the Day about u.

337. Tolentino, Troy

Achieve Buttermilk Pancakes

Undergraduate - Fraternity & Sorority Life

Growing up as a child, Ihop would always be my #1 restaurant to eat at. I would always order, most notoriously, their buttermilk pancakes. Their buttermilk pancakes was inevitably, the epitome of childhood, craving it for breakfast, lunch, dinner, and dessert. In-despicably, Ihop’s broccoli keish ceased to exist in my childhood, representing merely nothing but a void in my existence that had never been filled. I remember the pancakes, and the pancakes only. Analogizing this concept of my happiness for buttermilk pancakes, and complete resentment towards broccoli keish, imagine a clinical setting, in which the surgeons are assigned different specialties every day. Surgeon Bob only likes to work OBGYN, but is assigned Neurosurgery one day. His attitude reflects his work, in which his “happiness for buttermilk pancakes” is associated only with OBGYN, and his “hatred for broccoli keish” correlates with Neurosurgery. If this was the mentality for doctors alike, the basis of a hospital would become counterproductively ineffective. As a doctor, you agree to the liability of working with the vast number of concerns a clinical setting demands. Now, imagine if our society created a culture in which people have this predisposition of only wanting buttermilk pancakes for certain aspects of life. How do we change Bob to have “buttermilk pancakes” for both OBGYN AND neurosurgery? We end this thing called “mandated”.

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Within various organizations, a standard of “mandating events” has exacerbated overtime, and has become the central platform for motivating members to attend events. However, what people fail to realize is that mandating events is detrimental to the development of society.

Achieve buttermilk pancakes through…

1. Attendance ≠ success
2. Fewer events, multiple outcomes
3. F.I.R.E.
4. Shift mindset from requiring to providing
5. People support what THEY create
6. Challenge mandatory up the food chain
7. More fun

338. Udoetuk, Stella and Alzagha, Ronahy

**H.E.A.R.T.: Helping Elevate Active Response Time**

*Undergraduate – LAS*

**Presentation Type** – Oral Presentation/Impact on Community/Civic Engagement & Social Justice

Out of hospital cardiac arrest (OHCA) survival rates are significantly low in Chicago (4%) in comparison to the national average (11%). However, research has shown that bystander CPR intervention triples the chance of survival for OHCA patients. In partnership with the Illinois Heart Rescue, whose goal is to double the survival rate of OHCA in Chicago by providing bystander CPR training, a project was designed to further that goal by providing education tailored to elementary, middle, and high school students in the Auburn Gresham area. The workshop, designed to teach the importance of being heart healthy, the 4C’s of CPR, as well as self and community advocacy, was taught to over 50 students in Auburn Gresham at Barton Elementary School. Through an assessment given to the student before and after the workshop, it was shown that students were able to grasp key workshop concepts such as, “What are the 4C’s” and “How long do you compress for?.” Most students also self-reported from a post-workshop survey that they felt confident enough to perform CPR and that they felt able enough to teach how to perform CPR to family and friends.

339. Wagner, Jessica

**Effects of Relaxation Techniques on Children of Domestic Violence Victims**
Undergraduate – Applied Psychology Internship

Presentation Type – Poster/Impact on Community/Career Development

The agency I have been interning at this year is Between Friends, a resource and counseling center for victims of domestic violence. Their mission is to break the cycle of domestic violence and build an abuse-free community. The center offers referrals to domestic violence shelters, legal advocates, and other domestic violence centers across the Chicago-land area. Besides offering domestic violence victims a variety of referrals, Between Friends also offers individual counseling services, group therapy, family therapy, as well as individual and group therapy for children and teens that may have either witnessed domestic violence and/or have been victims themselves. Lastly, Between Friends runs their own violence prevention program called Relationship Education: A Choice for Hope. Members of the R.E.A.C.H. team educate community members and adolescents in high schools around Chicago on teen dating violence and how to recognize the difference between healthy relationships and unhealthy ones. Realizing that domestic violence can affect all types of individuals, Between Friends offers their programs to any person, regardless of color, race, religion, sex, sexual orientation, gender, age, marital status, ability, language capacity, or national origin. My responsibility is to help facilitate the children’s group therapy sessions. Not only that, but I also update the center’s community board with new sources of information and positive tips on how to effectively manage stress and take on new projects from both our financial counselor and human resources consultant. I have also been trained to answer the crisis line so that when the resource consultant needs someone to cover her shift, I can do so. Fortunately, I have had the opportunity to complete a required internship, and an advanced internship to have more impact on the families. Because of long term training and service, I have been given the opportunity to directly impact children’s responses after having been exposed to domestic violence. This opportunity to provide positive alternatives to PTSD, has also had an impact on me.

340. Walte, Samantha

Project LINK: Low-Incidence Network

Grad/Professional – Special Education

Presentation Type – Oral Presentation/Impact on Community/Leadership & Involvement

Students with significant disabilities such as moderate to severe intellectual disabilities, Down syndrome, autism, and multiple disabilities are often referred to as students with “low-incidence” (LI) disabilities because their disabilities are rare and their needs are unique. Because students with LI disabilities comprise only an average of 1% of the population, their schools and teachers can feel ill-equipped to fully address each student’s individual needs. There is often only one or two teachers of students with LI disabilities
in each building and this can leave them feeling somewhat alone, without anyone with whom to share ideas, trade resources, or ask for advice. Research has shown that the quality of educational services for students with LI disabilities as well the level of inclusiveness increases as teacher self-efficacy increases. This Collaborative Community Engagement project addressed this by providing teachers of students with LI disabilities in schools near UIC with two targeted forms of support: coaching and community. Two UIC doctoral students in Special Education provided in-person support, troubleshooting, and coaching for teachers who have students with LI disabilities. This was teacher-driven, meaning that the coaches observed classrooms during parts of the day the teacher felt they would most like feedback, provided collaborative and constructive discourse, and offered ongoing support to implement any strategies that the team agreed would be helpful. An ongoing system of support and increased connectedness between teachers of students with LI disabilities will help grow the reach of the coaching provided to the teachers. Through feedback from teachers, we helped build a functional, feasible system of communication and support. This community of LI teachers includes a combination of in-person meetings, online forums, and Skype-type chats but, again, will be shaped by the teachers to increase the likelihood of its survival after the project is over.

341. We, Yonsoo and Thorkildsen, Theresa

**Ignore the Model Minority Stereotype and Increase Self-efficacy to Undermine Perfectionism**

*Undergraduate - Education*

**Presentation Type** - Poster/Impact on Community/Research

Asian American students are assumed to experience more pressure and anxiety to achieve well in school than peers from other ethnic groups because of the model minority stereotype. To explore the influence of priming undergraduates to think about the model minority stereotype on their beliefs about the stereotype, perfectionism, and self-efficacy, 52 volunteers were randomly assigned to either a primed or an unprimed condition. In the primed condition, self-identified Asian, Latino, and White undergraduates evaluated items about the model minority stereotype prior to completing a structured interview about their involvement in society and an assessment of their self-efficacy and perfectionism. Self-identified Asian, Latino, and White undergraduates in the unprimed condition evaluated the model minority stereotype after they completed the other research activities. There were no significant differences in the beliefs of undergraduates in the primed and unprimed groups, or across ethnic groups. When these beliefs were used to predict academic grades, undergraduates’ exposure to the model minority stereotype played no role, but undergraduates who reported the highest grades also reported higher level of self-efficacy and lower levels of perfectionism. Educators may use this information to support programs that promote self-efficacy and deemphasize perfectionism in their teaching, regardless of students’ ethnicity.
342. Wright, Dorothy

Multiple Personalities of Wet Sclerophyll Forest: One Ecosystem or Many Ecotones of Species Change?

*Undergraduate – Study Abroad*

**Presentation Type** – Poster/Impact on Community/Environmental Awareness & Sustainability

Wet sclerophyll forest (WSF) found in far north Queensland Australia Wet Tropics bioregion is flanked by tropical rainforest (RF) east and dry savanna (S) west. WSF is fire dominated and contains drought-resistant vegetation. There is debate among the scientific community regarding the function of WSF. Some ecologists argue that WSF is its own ecosystem separate from RF or S. Others characterize it as a gradient of ecotones or changes in vegetation species ranging from wet RF to dry S. Analysing the functional traits (FT) of plant leaves can determine if this is the case. FT can determine species differences in productivity and performance and thus the distribution of species in nature. Leaf mass per area (LMA), determined by (leaf dry mass/leaf area) and leaf area (LA) are morphological traits which highly correlate with leaf processes (i.e.; photosynthetic/respiratory rates, species’ growth rates, etc.) Therefore, LMA and LA are good indicators of the location of species along an axis based on resources acquisition (de la Riva GE et al. 2016). The aim of this study is to determine if WSF is several ecotones by analyzing the FT traits LMA and LA. Univariate one-way ANOVA analysis was used to determine significant differences between vegetation types. The results indicate significant differences between four out of six sites sampled for their vegetation. These data strongly support that WSF is several ecotones because significant differences indicate WSF species are different enough that it is highly unlikely they are related to the same ecosystem. The relevance of this study is principal to land management and conservation practices. WSF is fire dominated thus fire disturbance is a relevant concern for local flora, fauna, and agriculture. When land managers and conservationist better understand WSF more appropriate practices and policies can be put into effect to preserve it.

343. Xu, Colin and Xie, Katherine

A Case Study of How Interdisciplinary Collaboration Fosters Innovation

*Undergraduate – Bioengineering*

**Presentation Type** – Oral Presentation/Impact on Community/Leadership & Involvement
Specialization has allowed individuals to become experts in a very narrow field. The desires of a society are delegated to specialists of one form or another: problem solving to the engineers, health to the doctors and nurses, education to the teachers, etc. This has enabled us to efficiently grow and industrialize into the society we are today. However, at the same time, hyper-specialization has obscured the connections between different fields and made it difficult to address the increasingly complex needs of society. The problems facing modern healthcare call upon deep collaboration between specialists of all fields. The UR*lab is an interdisciplinary team of physicians, engineers, designers, and businesspeople working together to advance urological healthcare. The recent development of a device, an automated urine meter, highlights the interdisciplinary processes at play and serves as a case study of how collaboration fosters the innovation and development of novel solutions.

344. Yamini, Omar

Comprehending Consequences

Grad/Professional – Youth Development/College of Education

Presentation Type – Creative Presentation/Impact on Community/ Civic Engagement & Social Justice

Comprehending Consequences is an academic Social Emotional Learning (SEL) program designed to help our students internalize the behaviors that lead to prison. We use evidence-based methods to warn and educate young people of the consequences of where inviting harmful influences into their lives can and will lead them. Our mission is to dismantle the school to prison pipeline by keeping as many of our youth as humanly possible from ever stepping foot inside a prison cell.